THE UNIVERSITY OF ALBERTA

AN EXAMINATION OF ECONOMIC FACTORS AFFECTING THE LOCATION AND OPERATION OF THE BEEF PACKING INDUSTRY IN CANADA WITH PARTICULAR REFERENCE TO ALBERTA

BY

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The undersigned certify that they have read and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled "An Examination of Economic Factors Affecting the Location and Operation of the Beef Packing Industry in Canada With Particular Reference to Alberta," submitted by Anne J. McLean Bullen in partial fulfilment of the requirements for the degree of Master of Science.

ABSTRACT

During the last decade in Canada, there has been increasing decentralisation of the meat packing industry, in particular the beef packing sector, from major consumer markets towards expanding sources of supply in the Prairies. This feature has been particularly evident in Alberta. This thesis examines factors which have influenced decisions on the choice of location for beef packing plants. The study also investigates beef packing plant operations in Alberta.

The increasing density of high grade slaughter cattle supplies in Alberta has been the main reason behind the decentralisation of the industry, both in Canada and within the province itself. The negotiable transportation rate structure, regional differentials in wages and costs of utilities, and the Federal Government's regional development programme have also been factors in locational choice.

Despite the continuing rise in per capita consumption of beef by an expanding and increasingly affluent population, over-optimism by the beef packers with regard to the rate of expansion in the livestock population has contributed to a problem of excess capacity in the industry. The resulting under-utilisation of existing capacity appears to have some adverse effects on plant costs of operation.

The major recommendations of the study are that there be more consideration of methods to improve capacity utilisation and that the industry continue to adopt technological and marketing innovations and other potential cost savings to improve its methods of operation and

its profit position. There should be some reappraisal of government policy which should be consistent with balanced regional development and the future economic health of the packing industry. More cooperation between the meat packers and disinterested researchers is also recommended.

ACKNOWLEDGEMENTS

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In years to come the brightest memory of my thesis work will be the many Canadian friendships I made while writing it and the gallant good humour of my fellow students towards one of the fair sex in their midst. I was thoroughly spoilt. Thank you all and haste ye o'er the water soon!

Last but not least, my deepest thanks to my Mother, without whose generous sacrifice my Canadian adventure would have remained but a dream.

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CHAPTER I

INTRODUCTION

The Beef Industry in Canada

Over the period 1960 to 1972, beef has remained the most important meat in the consumer preference schedule. In 1960 per capita consumption of beef in Canada was 70.0 pounds and by 1971 this had risen to 86.9 pounds. Per capita consumption of pork, the main red meat substitute for beef, was 52.6 pounds in 1960 and 56.9 pounds in 1970. In 1971 increased production and marketings of pork were associated with decreased consumer prices and per capita consumption increased to 65.9 pounds. Per capita consumption of veal, mutton, and lamb has been declining over this period.[1] (Table 1.1 and Figure 1.1.)

Projections have been made which indicate that similar consumption trends are likely to continue. Yankowski has estimated that with price trends similar to those of the past, beef consumption will rise to 117 pounds per capita in 1980, or 113 pounds if beef prices increase about 5 percent above the long-term trend.[2]

The rising per capita consumption of beef is reflected in rising production levels. The total number of cattle slaughtered in

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[1] Statistics Canada, Estimates of Production and Disappearance of Meats, Cat. No. 32-220 (Ottawa: Queen's Printer, 1960-1971).

[2] Z. Yankowski, "The Intermediate and Long Term Market Outlook for Beef," Canadian Farm Economics, Vol. 5, No. 3 (August, 1970), pp. 7-8.

TABLE 1.1

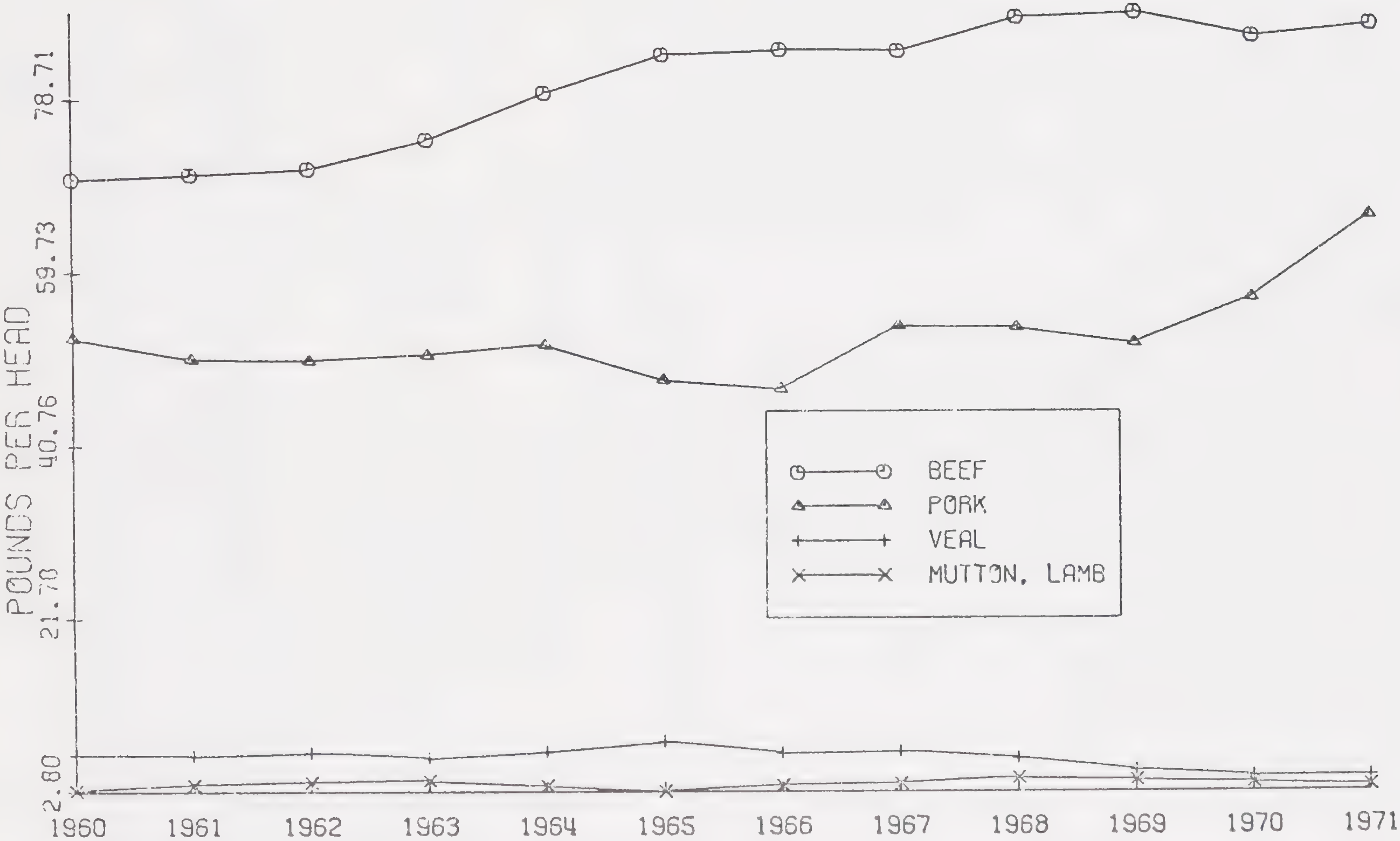
PER CAPITA DISAPPEARANCE OF RED MEATS IN CANADA, 1960-1971

Year	Beef	Pork	Veal	Mutton and Lamb
		(pounds)		
1960	70.0	52.6	6.9	2.9
1961	70.5	50.3	6.8	3.5
1962	71.1	50.1	7.1	3.8
1963	74.3	50.7	6.5	4.0
1964	79.4	51.8	7.2	3.4
1965	83.6	47.9	8.3	2.8
1966	84.1	46.9	7.0	3.4
1967	84.0	53.8	7.2	3.6
1968	87.7	53.6	6.4	4.2
1969	88.2	51.9	5.1	4.0
1970	85.6	56.9	4.4	3.7
1971	86.9	65.9	4.4	3.3

Source: Statistics Canada, Estimates of Production and Disappearance of Meats, Cat. No. 32-220 (Ottawa: Queen's Printer, 1960-1971).

FIGURE 1.1

PER CAPITA DISAPPEARANCE OF RED MEATS IN CANADA 1960-1971



Canada rose from 2,213,403 head in 1960 to 3,088,808 head in 1971.[1] In Alberta the increase has been very rapid, rising from 468,531 head in 1960 to 1,048,067 head in 1971.

The location of the meat packing industry has also been changing over time. Packing plants have been moving from major population and consumption markets in Eastern Canada towards sites at the expanding sources of beef supply in the Prairies. The meat packing industry has annual sales of about 2 billion dollars and ranks as the third largest of all manufacturing industries.[2] Table 1.2 indicates the geographical redistribution of packing plants over the last ten years and the associated shifts in employment and value of shipments. Comparison of the number of plants by province, however, can be misleading because the categories of plants may vary under different provincial inspection systems.

As at March, 1971, Canada Packers had total investments of $35,579,000 in Alberta, made up as follows:[3]

	Fixed assets (at cost)	Current assets ($'000)	Total
Meat packing plants	$15,074	$12,962	$28,036
Other operations	3,976	3,567	7,543
Total	$19,050	$16,529	$35,579

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[1] Statistics Canada, Livestock and Animal Products Statistics, Cat. No. 23-203 (Ottawa: Queen's Printer, 1960-1970). Also, Statistics Canada, Livestock Estimating Unit, Agriculture Division (unpublished information, Ottawa, 1972).

[2] The Meat Packers' Council of Canada, Meat 1971-72 (Islington, Ontario: The Meat Packers' Council of Canada, 1972), p. 3.

[3] Company information, 1972.

TABLE 1.2

VARIATION IN THE GEOGRAPHICAL DISTRIBUTION OF PACKING PLANT ACTIVITY 1960, 1965, 1970

Province	1960					
	Number of Plants[a]	Percentage of Canadian Total	Number of Employees	Percentage of Canadian Total	$'000 Value of Shipments	Percentage of Canadian Total
British Columbia	17	8.0	1,579	6.1	60,846	5.7
Alberta	21	10.0	3,838	14.8	170,683	16.2
Saskatchewan	10	4.8	1,357	5.2	49,015	4.6
Manitoba	13	6.4	2,110	11.2	124,623	11.8
Ontario	72	34.3	9,698	37.4	396,066	37.4
Quebec	64	30.5	5,737	22.1	231,551	21.9
Atlantic Provinces	13	5.2	827	3.2	25,656	2.4
Canada	210	100.0	25,946	100.0	1,058,440	100.0

Province	1965					
	Number of Plants	Percentage of Canadian Total	Number of Employees	Percentage of Canadian Total	$'000 Value of Shipments	Percentage of Canadian Total
British Columbia	37	9.3	1,705	5.7	74,716	5.2
Alberta	33	8.3	4,618	15.4	278,641	19.4
Saskatchewan	15	3.8	1,471	4.9	67,037	4.7
Manitoba	25	6.3	3,065	10.2	144,636	10.1
Ontario	134[c]	33.6	11,195	37.3	548,376	38.1
Quebec	129	32.3	6,880	22.9	286,311	20.0
Atlantic Provinces	26	5.5	700	2.3	26,190	1.8
Canada	399	100.0	29,986	100.0	1,438,738	100.0

Province	1970[b]					
	Number of Plants	Percentage of Canadian Total	Number of Employees	Percentage of Canadian Total	$'000 Value of Shipments	Percentage of Canadian Total
British Columbia	42	9.3	1,739	5.6	99,659	4.8
Alberta	43	9.5	4,820	15.5	433,381	21.1
Saskatchewan	21	4.6	1,569	5.0	111,758	5.4
Manitoba	28	6.2	2,935	9.4	213,454	10.3
Ontario	159	35.1	11,273	36.2	736,177	35.7
Quebec	134	29.6	7,642	24.6	416,502	20.2
Atlantic Provinces	26	5.7	1,121	3.6	59,910	2.5
Canada	453	100.0	31,099	100.0	2,062,841	100.0

[a] Federally inspected plants.

[b] Statistics Canada, Manufacturing and Primary Industries Division, (unpublished information: preliminary figures, Ottawa, 1972).

[c] Most plants in Ontario and now under federal inspection or an accepted equivalent; hence the increase from 72 to 134 plants.

Source: Statistics Canada, Annual Census of Manufacturers, Slaughterers and Meat Processors, Cat. No. 32-221 (Ottawa: Queen's Printer, 1960, 1965).

About two thirds of the $19,050,000 investment in fixed assets in Alberta has been committed over the past ten years and $15,074,000 of this $19,050,000 has been invested in meat packing plants, as is indicated below:

	Meat packing plants
Total as at March, 1961	$6,004,000
Additions 1962-1966	1,726,000
1967-1971	7,344,000
Total as at March, 1971	$15,074,000

In 1971 the Swift Canadian Company's operations in Alberta were made up as follows:[1]

Total expense--including purchase of livestock wages and salaries, supplies, utilities, etc.	$95,000,000
Sales of Alberta product in other provinces	$49,000,000
Total investment in fixed assets	$17,000,000
Estimated capital cost of a new plant in 1970	$ 3,551,000

The shift of meat packer investment to Alberta appears to be continuing.

Problem Definition

The meat packing industry in Alberta, in particular the beef packing sector , seems to have been facing two main problems: the existence of considerable excess capacity and alleged low profit margins on beef slaughtering and packing. The amount and location of capacity available may now be affected by the impact of Federal Government policy, as conceived in the programme of the Department of Regional

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[1] Company information, 1972.

Economic Expansion. Under-utilisation of capacity may be contributing to a problem of inefficiency in packinghouse operations, with consequent adverse effects on plant costs and profit positions.

The decentralisation of beef packing plants from consumer markets towards expanding sources of supply in the Prairies could, perhaps, have been expected to lead to higher levels of capacity utilisation. Yet, current industry estimates suggest that many plants may only be operating at 50-60 percent of kill capacity.[1] These estimates corroborate calculations made in previous studies which all agree that the slaughter capacity in the Prairies will be adequate to meet the requirements in 1980, if present slaughter trends continue. Nicholson estimated that Canada had an average of 44 percent excess cattle slaughter capacity in 1961.[2] In 1967, Bronson concluded that this estimate was probably too low since slaughter capacity has continued to increase faster than the numbers of livestock killed.[3]

Table 1.3 indicates the amount of new packing plant capacity recently constructed and under construction or consideration in Alberta.

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[1] Confidential industry information for Alberta, 1972. Utilisation of kill capacity is measured against the ultimate potential of moving line facilities on the slaughter floor, but this limit can also vary by single or double shift and the number of men in a gang. Precise specification of "capacity" is, therefore, complex.

[2] R. C. Nicholson, Livestock, Meat and Farmers, Publication No. 101 (Saskatoon: University of Saskatchewan, Department of Agricultural Economics, July, 1965), p. 90. Historically, the amount of excess capacity in the meat industry has arisen because of the large seasonal fluctuations in beef cattle marketings and slaughter supply. Packers required sufficient plant capacity to cope with peak supply periods.

[3] H. E. Bronson, Canadian Meat Packing and Farmer Organisation (Saskatoon: University of Saskatchewan, October, 1967), p. 15; see also, Management Research Associates, The Potentials and Requirements for Future Developments of the Livestock Industry in Western Canada (Corvallis, Oregon: February, 1970), p. 214.

TABLE 1.3

INDUSTRIAL PROJECTS: ALBERTA, 1971[a]

Projects Completed 1971		Projects Under Construction at Year End		Projects Under Consideration at Year End	
		(capital costs of $100,000 or more)			
Canada Packers Lethbridge	- Hidecuring 575,000	Burns Foods Ltd. Edmonton	- Packing Plant 4,000,000	F. G. Bradley Co. Edmonton	- Specialty Meats 500,000+
Canadian Dressed Meats, Lethbridge	- Beef Pre-cut & Packaged 557,000	Capital Packers Ltd., Edmonton	- Meat Packing & Processing 300,000	North American Integrated Food Processing Co., Taber	- Pork Processing 8,000,000+
Grande Prairie Packers, Calgary	- Packing Plant 1,250,000	Lakeside Packers Brooks	- Packing Plant 1,500,000		
Rocky Mountain Packers, Calgary	- Processed Meat 1,000,000				
Swift Canadian Co. Ltd., Lethbridge	- Packing Plant 3,600,000				

[a] Total capital cost involved is over 21 million dollars.

Source: Alberta Bureau of Statistics, Alberta Business Trends (Edmonton: Government of Alberta, Department of Industry and Tourism, January, 1972), pp. 17-23.

If the estimates of capacity requirements made in the studies previously cited are reasonably accurate, this increase in slaughtering facilities can only exacerbate the present excess capacity problem. A past president of the Meat Packers' Council of Canada expressed the problem in the following way:

> The meat packing industry in Canada has always been plagued by excess plant capacity... Right at this moment the meat packing industry in Alberta has the capacity to handle 25,000 cattle a week but, in 1970, the average weekly slaughterings in Alberta were only 17,000... Despite this tremendous excess capacity in Alberta, we have seen in the past year and a half, the opening of a new cattle slaughtering plant and the reactivation of another which had been closed... On top of all this we now face three more new beef plants in Alberta... For all practical purposes the supply of cattle is fixed in the short run and changes only slowly in the long run. The three new plants, therefore, cannot tap any new supply of livestock. They can only try to take cattle and hogs away from existing plants.[1]

Comments from within the industry indicate that, in several cases, insufficient research has been carried out before proceeding with development plans.[2] It also appears possible that a distortion of the locational advantage of selected sites has occurred because of federal government capital investment grants and incentives in designated areas.[3] The industry feels that the feasibility studies with respect to these grants are inoperative, inaccurate or inadequate, so that, "under these circumstances, our industry has a right and

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[1] A.J.E. Child, "President's Address," Proceedings of the Meat Packers' Council of Canada, 51st Annual Meeting, Calgary (Islington, Ontario: The Meat Packers' Council of Canada, February, 1971), pp. 6-7.

[2] Confidential industry information, Alberta, 1972.

[3] Department of Regional Economic Expansion, Canada Development Incentives for Industry in Designated Regions and Special Areas (Ottawa: Information Canada, 1971).

to protest this use of the taxpayers' money."[1] It would seem from this, that there is a problem of communication and of reaching agreement between the government and the meat packers over the most economically rational policy for the industry in future.

The packers also claim that the earnings from beef operations are low and they imply that the under-utilisation of existing capacity contributes to this unfavorable profit position.

The Objectives of This Study

The study seeks to examine factors responsible for the trend in the beef packing industry towards decentralisation and dispersal nearer to sources of supply. The variables affecting the locational advantage of Alberta to the packing industry will be considered. It is hypothesized that:

1. The changing location of regional beef cattle production is the major factor which has influenced packing plant decentralisation over the last decade. Examination of this hypothesis will include consideration of the regularity and density of available slaughter supplies by region.

2. The freight rate structure by rail and road, with respect to beef products and live cattle shipments, is also a major factor in locational choice.

3. Future population distribution and income trends are the major factors encouraging continued expansion of the livestock-meat industry as a whole.

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[1] Child, op. cit., p. 7.

4. Under-utilisation of plant capacity contributes to operational inefficiency and low profit margins in beef packing.

5. Subsidisation of capital and labour in the meat packing industry by the government, in the programme of the Department of Regional Economic Expansion, has not encouraged an optimal pattern of packing plant location in Alberta.

6. Regional differentials in wages and costs of utilities are additional factors influencing choice of plant location.

General Method of Approach

Chapter Two discusses location theory as it relates to the beef packing industry with respect to the present situation in Canada and in Alberta. A brief literature review on the topic is included. Chapter Three attempts to estimate the location and quality of potential cattle slaughter supply by province, making adjustments for (a) inter-provincial movements of livestock and (b) imports and exports, both of live cattle and of beef products. Other elements which may influence the choice of packing plant sites such as the provincial supply inventory--the levels of cattle marketings and the numbers of cattle on farms--are also considered. The surplus or deficit status of each province is estimated for the period under review. Included in Chapter Three, also, is an examination of the role of the transportation system by rail and road, which is hypothesized to influence locational choice. The supply and demand data used were taken from secondary sources. The transportation information was obtained from the Transport Research and Development Branch of the Alberta Department of Industry and Tourism, the Canadian Pacific and the Canadian National Railways.

Chapter Four analyses the present situation in the livestock-meat industry within Alberta, partly using secondary data and partly using information collected from interviews and a questionnaire. Supply, demand, cost conditions and other elements in the current situation confronting the industry are examined and operational efficiency is discussed. Chapter Five has a recapitulation, comments and conclusions on the findings of this study on the Alberta beef packing industry.

CHAPTER II

RELEVANT LOCATION THEORY

This chapter considers those areas of location theory which are relevant to the operation of an agricultural processing industry. The discussion is then related to the meat packing industry in Canada and in Alberta and a survey of the North American literature and research which has been done relating to the meat packing industry is presented.

Given the assumption that the main objective of a business enterprise is the maximisation of profits, it would appear that producer preference for a particular location is influenced by the stability, security and potential of the rate of earnings at that site. Net revenue is determined by any economic attributes or disadvantages of that location with respect to costs of raw material procurement, costs of labour, utilities, transport, and distribution. Adjustment to change necessitates constant reappraisal of operational decisions, which may be affected by the spatial location of economic activity. Any theory of location, therefore, should attempt to incorporate dynamic parameters such as technological changes in methods of production, in transportation, communication, and distribution. Isard argues that any business enterprise substitutes among various outlays and revenues when it selects the goods to be produced and where to produce them, such that net revenue can be maximised within a situation of constraints which vary by region.[1]

[1] W. Isard, Location and Space Economy (New York: The Technology Press of the Massachusetts Institute of Technology and John Wiley & Sons, Inc., 1956), pp. 96, 118-119.

Costs of Operation of an Agricultural Processing Industry

The total costs of operation of such an industry may be considered as a combination of outlays for procurement, processing and distribution. With respect to procurement cost, locational advantage may be measured by the level of all costs incurred in obtaining various quantities of the required raw material inputs in their necessary relative proportions. Locational processing advantages may be measured by production costs, which are determined by the prices of all factor inputs and the quantities and qualities needed per unit of output. Externalities may also exert an influence. Plant distribution costs may be measured by the costs of satisfying demand at any point of consumption, in other words, how much the plant can expect to sell at various levels of realized price per unit of product, after deduction of selling and delivery expenses.

Procurement Cost

Since procurement cost is a major determinant of the locational advantage of any site, a processing plant will seek an effective "collection" centre from which can be secured a dependable flow of adequate supplies at the least possible cost. The impact of differences in procurement costs has been considered in more detail by various studies and has been embodied in some plant location models.[1] With a constant density

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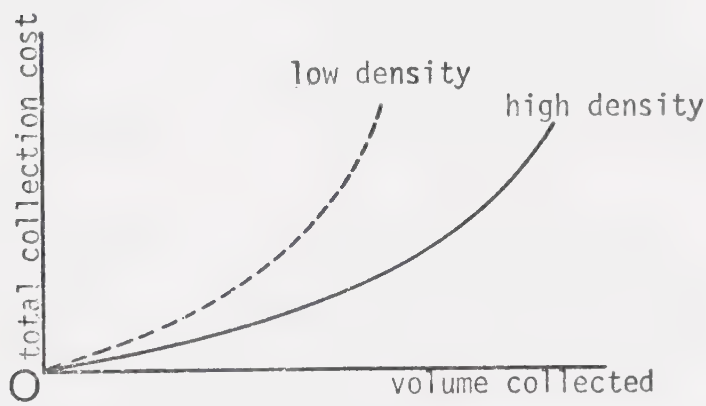
[1] B. C. French, L. L. Sammet and R. G. Bressler, Jr., "Economic Efficiency in Plant Operations with Special Reference to the Marketing of California Pears," Hilgardia, Vol. 24, No. 19 (Berkeley: University of California Agricultural Experiment Station, July, 1956); W. R. Henry and J. A. Seagraves, "Economic Aspects of Broiler Production Density," Journal of Farm Economics, Vol. 42 (February, 1960), pp. 1-17; G. A. King and S. H. Logan, "Optimum Location, Number and Size of Processing Plants with Raw Product and Final Product Shipments," Journal of Farm Economics, Vol. 46 (February, 1965), pp. 94-108; B. C. French, "Some Considerations in Estimating Assembly Cost Functions for Agricultural Processing Operations," Journal of Farm Economics (November, 1960), pp. 767-778; J. F. Stollsteimer, "A Working Model for Plant Numbers and Locations," Journal of Farm Economics, Vol. 45, No. 3 (August, 1963), pp. 631-645; R. G. Bressler and R. A. King, Markets, Prices and Interregional Trade (New York: John Wiley and Sons, Inc., 1970).

of production, raw material volume obtained by the plant will be a function of the size of the supply area and collection costs will tend to increase with distance. The relationship between volume of supply and collection costs, however, depends on density of production. Figure 2.1 illustrates the possibilities as interpreted by Bressler and King.

FIGURE 2.1

THE EFFECT OF VOLUME AND PRODUCTION DENSITY ON TOTAL COLLECTION COSTS



Source: R. G. Bressler and R. A. King, Markets, Prices and Interregional Trade (New York: John Wiley & Sons, Inc., 1970), p. 142.

Figure 2.1 indicates that collection or procurement costs increase more rapidly with a lower density of production, reflecting the greater distances involved in obtaining a given quantity of supply volume. The effect of a number of competing plants serving the same producing area would tend to reduce procurement costs as the number of plants increased, since each would have a smaller supply area. At the same time, the processing costs would increase since each plant would possibly obtain a volume too small to exploit fully, all possible internal, technical

economies of scale. The optimum number and location of plants would be determined when the reduction in assembly and procurement costs is just offset by the increase in processing costs as the number of plants increases.[1]

Processing Costs

Processing or production costs are determined by the quantities and prices of factors of production, and by the efficiency with which the firm uses these factors of production. If regional differentials exist in the prices of some factor inputs, such as labour, fuels and transport services, this may lead to differences in production costs of firms related to their location. It is assumed that the firm will seek to maximise profits.

Fixed or overhead costs may be defined as those costs which cannot be altered in the time period considered. In the short run when the firm cannot vary its fixed resources, its fixed costs are constant. This includes the cost and maintenance of capital equipment, plant insurance and basic management costs. Variable costs are associated with the variable factors of production; they rise as the firm's output increases, since increased output requires increased inputs of variable resources. In the long run, as the firm has the opportunity to vary its scale of plant, all factors of production and costs are variable.

In Figure 2.2, ATC represents the average total cost function of a firm; AFC represents average fixed costs (total fixed cost divided by output); AVC represents average variable cost (total variable cost

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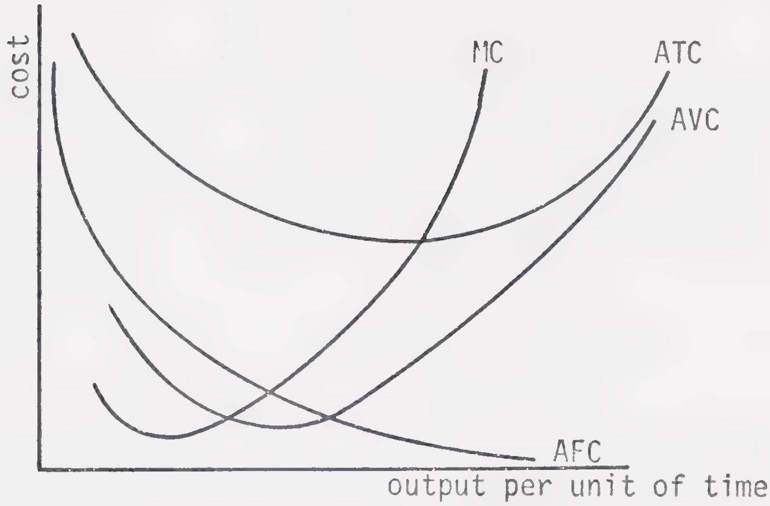
[1] Bressler and King, op. cit., p. 146.

FIGURE 2.2

A TYPICAL SET OF COST CURVES



Source: C. E. Ferguson, Microeconomic Theory (Revised edition. Georgetown, Ontario: Irwin-Dorsay Ltd., 1969), p. 198.

divided by output); and MC represents the marginal cost function. The AFC curve is negatively sloped since, as output increases, the ratio of fixed cost to output must decline. Where fixed costs are a major component of total costs, a firm has an incentive to reduce fixed costs per unit of output by spreading the fixed costs over more units of output.

Average variable cost generally declines until a minimum is reached and thereafter increases. Its shape is governed by the tenets of production theory and reflects the shape of the average product curve which increases to some maximum point before declining. Average total cost will decline until it reaches a minimum point at a higher output level than the minimum of the AVC curve, and then it increases. The larger are

fixed costs before the minimum point on the average total cost curve is reached, and the more rapidly variable costs increase after this point, the more pronounced will be the U-shape of the short run average cost curve.

The marginal cost curve will decline and then, reflecting the law of diminishing returns, will rise as the marginal product eventually falls.[1] Marginal cost is defined as the change in total cost resulting from a one-unit change in output.

The Long Run

In the long run all inputs are variable. Ferguson emphasizes the importance of the "planning horizon" aspect of the long run.[2] In the long run, entrepreneurs may plan and choose many aspects of the short run in which they will operate in the future. The long run therefore, consists of all possible alternative short run situations from which an entrepreneur may choose. This serves as an intuitive explanation underlying the feature that every point on the long run average cost curve (LRAC) is a point on each of the short run average cost curves which it "envelopes." In the long run a firm can be expected to choose that scale of plant capable of producing an expected level of output at the lowest unit cost.

Other considerations, however, impinge on the decision on the scale of plant to be adopted. This is pointed out in Figure 2.3

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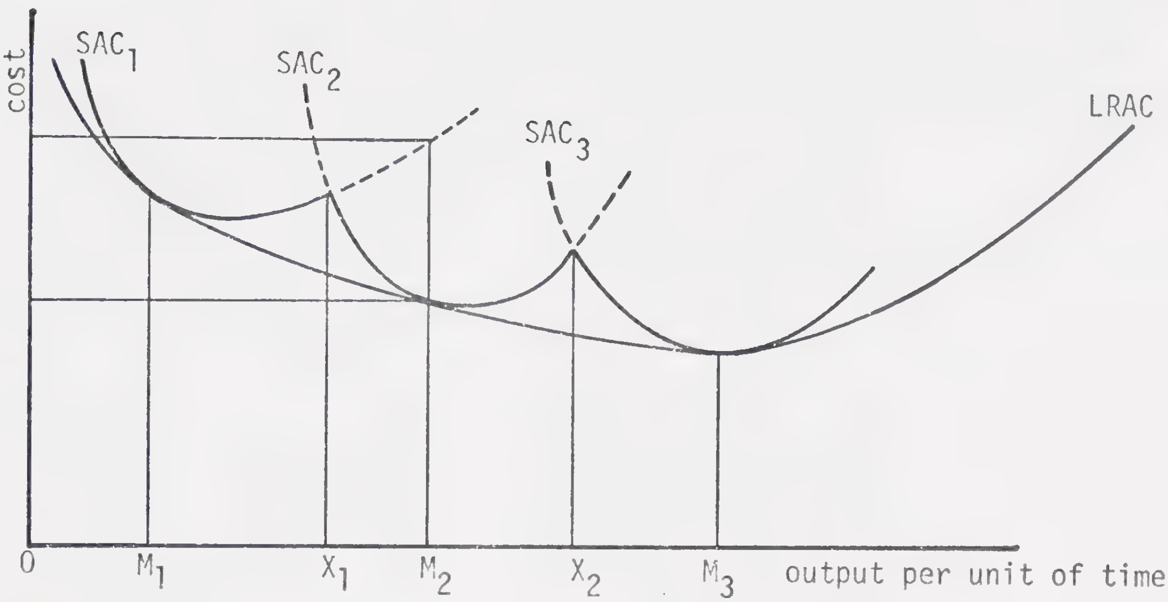
[1] Marginal cost at each level of output indicates the rate of change (or slope) of the total cost curve (and of the total variable cost curve) at that output level.

[2] C. E. Ferguson, Microeconomic Theory (Revised edition. Georgetown, Ontario: Irwin-Dorsay, Ltd., 1969), p. 198.

FIGURE 2.3

SHORT RUN AVERAGE COST CURVES OF PLANTS OF DIFFERENT SCALES, AND THE LONG RUN AVERAGE COST CURVE



Source: C. E. Ferguson, Microeconomic Theory (Revised edition. Georgetown, Ontario: Irwin-Dorsay Ltd., 1969), pp. 199-200.

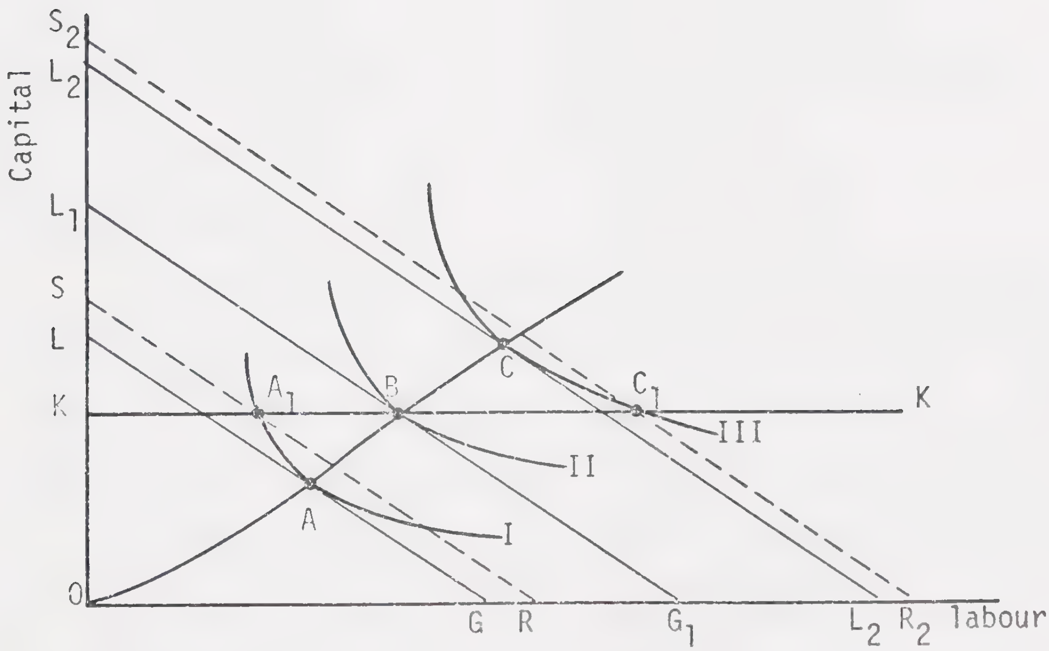
Assume that the short run average cost curves SAC_1, SAC_2, and SAC_3 (Figure 2.3), represent scales of plant that are small, medium and large, respectively. If the firm expects the most profitable output will be OM_1, the plant with SAC_1 will be built. If the anticipated most profitable output is OM_2, then the plant with SAC_2 will be chosen. The choice would be more difficult for outputs OX_1 and OX_2, since two plants can produce each output at the same average cost. A smaller plant might be chosen because it represented a smaller investment. However, the larger plant would be able to exploit any potential increases

in demand. Conversely, the smaller plant would be less vulnerable to reductions in demand, fluctuating supply conditions or any shortage of variable inputs. In other words, considerations other than that of achieving the least cost output may impinge upon the decision. OM_3 is the minimum cost output of plant SAC_3, which is the only plant (as illustrated above) where short run average minimum cost coincides with long run average minimum cost.[1]

Figure 2.4 shows the relationship between short run and long run cost functions.

FIGURE 2.4

SHORT AND LONG RUN PLANT ADJUSTMENTS



Source: C. E. Ferguson, Microeconomic Theory (Revised edition. Georgetown, Ontario: Irwin-Dorsay Ltd., 1969), p. 205.

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1 Ferguson, op. cit., p. 199-200.

Curves I, II, and III depict isoquants and A, B, and C depict equilibria points of tangency with the isocost curve lines shown as LG, L_1G_1, and L_2G_2; thus the line OABC traces out the expansion path. Assume that a firm of fixed scale KK, producing output at level II, is at a point B on its expansion path. If the firm wishes to expand output to level III, in the long run it will move to C with the associated total cost represented by the isocost line L_2G_2. Because the plant scale is fixed at KK in the short run, however, the firm must move to C_1 to achieve the desired level of output and this involves the higher total cost represented by the isocost line S_2R_2. Conversely, if a firm operating at B wishes to reduce output to level I, in the long run it will move to A with costs represented by the line LG, but in the short run the fixed resources constrain the firm to move to A_1 with the higher level of costs represented by the line SR. When plant scale can be altered in the long run, the least cost output can be achieved.

Economies of Scale

The curvature of the long run average cost curve (LRAC) is governed by the existence of constant, increasing or decreasing returns to scale. If returns to scale are constant, an increase of a given proportion in the resources used by a firm will increase the firm's output in the same proportion. If returns to scale are increasing a given proportionate increase in the resources used will increase output by a greater proportion. If returns to scale are decreasing output will increase less than in proportion to the proportionate increases in the inputs used.

A major reason for such economies is the increase in productive efficiency or a more sustained increase in the marginal product of labour,

which arises from the division and specialisation of labour. Also, indivisibility of some "lumpy" factors of production in the short run usually results in a firm's being unable to capture potential economies of scale, unless its operations are sufficiently large to fully utilise those "lumpy" factors--for example, units of capital equipment. If a firm's operation is small and the level of output is not large there may be some excess capacity.

At some point, as the scale of a plant is increased, the LRAC curve is generally assumed to rise due to diseconomies of scale. For example, there may be problems of management in the coordination and supervision of large plants. In production processes where economies of scale are not large, diseconomies may cause the LRAC curve to rise at smaller volumes of output. Conversely, the scale economies may be so great that the LRAC curve may continue to decline after diseconomies begin to have an effect. It may be the case, however, that most economies of of scale can be captured at a moderate scale of operation, but the effect of diseconomies may not be apparent until output is much larger.

External Economies

Alleged external economies are not normally quantifiable by the measures used for internal economies. External economies of scale, which can influence the level of processing or production costs, are outside the control of the individual firm. The external economies may be of a pecuniary or a technical nature. Pecuniary external economies for example, may arise from cost advantages in the procurement of large volumes of inputs. External technical economies may be related to the size of the industry or the character of the region in which a firm is located. Some external technical economies in an industry may

arise from agglomeration or urbanisation economies (from banking and insurance services, or the availability of specialised transportation services used by the industry).

It is assumed that a firm will consider all economies of scale both internal and external, whenever a locational shift of production is contemplated. Such a locational shift, for example, usually involves a trade off between the expense and effort involved and the disruption of established trade contacts, and the greater advantages of a new site with lower production and processing costs in the long run. Whether such a shift is made depends on a comparison of deficits at the present location, with total costs involved in the selection of a possible alternative and taking account, also, of any recoverable costs via the disposal of fixed assets at the present location.

Distribution Costs

This component of plant operating costs is related, in particular, to transportation costs. An important concept is the marginal cost per added mile per unit of product. The Weberian analysis considers plant location and distribution of output in terms of the relative strengths of attraction of raw material sources and consumption markets as these operate through transportation costs.[1]

The localised weight of material deposits encourages plant location near to sources of raw material supply, while the weight of the product at the place of consumption influences choice of site in relation

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[1] Alfred Weber, Theory of the Location of Industries, trans. C. J. Friedrich (Chicago: University of Chicago Press, 1929), p. 59.

to the market. Ubiquities, such as water, only influence the locational figure in their manufactured form within the product, since Weber defined a ubiquity to be a factor of production available anywhere. Thus defined, a ubiquity has no weight as a localised material. The solution to locational choice can be found by employing the material index, which is the proportion of the weight of localised material to the weight of the product. This index determines the total weight per unit of product to be considered for movement within the locational figure in any kind of productive process, since it indicates how many weight units of localised material have to be moved in addition to the weight of the product. This concept Weber called the "locational weight" of an industry. Two factors determine the material index: the size of the weight losses of localised materials used in the production process and the weight of the ubiquities used. The more weight that is lost in the production process, the more the material index increases, while each additional ubiquity used decreases it (since these are available anywhere).[1] An industry with a high locational weight and a material index greater than one will tend to locate at the source of materials, while an industry with an index of less than one will tend to locate at the place of consumption.[2]

As Isard emphasizes, one of the most serious faults of the Weberian analysis is its inability to encompass realistic transport rates which are less than proportional to distance and also its disregard of

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[1] By definition, therefore, in Weberian terms, they have no weight as localised materials.

[2] Weber, op. cit., pp. 61, 63-64.

terminal charges.[1] It was Hoover, however, who earlier gave a clear exposition of the influence of transport cost differentials on locational choice.[2] Such costs depend on the type of commodity, the volume of traffic and the distance. He also emphasized the importance of less than proportional increase in cost with distance, reflecting the effect of economies associated with longer hauls and the independence of terminal and loading charges of length of haul.[3] These factors encourage a plant to balance the relative advantages of locating either at the source of supply or at its market to eliminate short hauls and double loadings at intermediate points, unless such points are junctions or transshipment points for various transport media. Thus, he shows that transfer agencies such as road haulage companies, with low terminal charges, compete effectively for shorter hauls, but the rapid rate of increase in cost with distance beyond a certain point shifts the competitive advantage to the railways, which have lower line haul costs. Figure 2.5 explains this situation. Figure 2.6 explains Hoover's restatement of the Weberian conclusion that early stages of production will be located at the source of materials while later stages will be located nearer markets.

In Figure 2.6 the lines a and b indicate a possible impact of procurement and distribution cost. In this example, the more rapid increase in procurement cost pulls the plant towards the material source.

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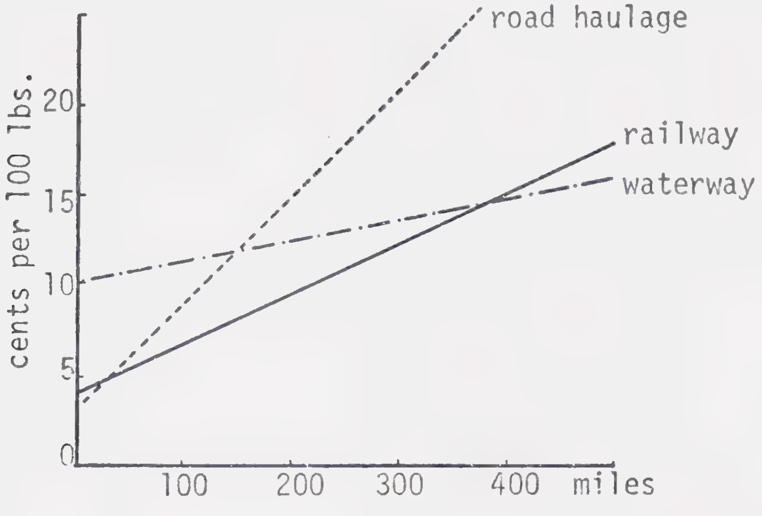
[1] Isard, op. cit., pp. 108-109.

[2] Hoover, op. cit., p. 15.

[3] Hoover, op. cit., p. 19. Nonproportionality of rates to distance occurs because schedules are usually simplified into blocks of uniform rates over a specified distance range.

FIGURE 2.5

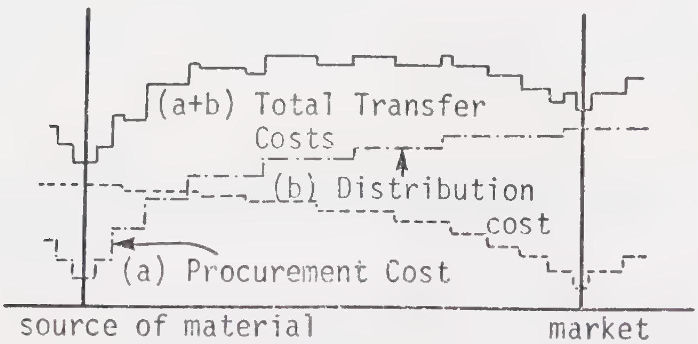
COMPARISON OF MILEAGE-COST SCALES FOR DIFFERENT TRANSPORT MEDIA



Source: E. M. Hoover, The Location of Economic Activity (New York: McGraw Hill, Inc., 1948), p. 20.

FIGURE 2.6

PROCUREMENT, DISTRIBUTION AND TOTAL TRANSFER COSTS PER UNIT OF PRODUCT BETWEEN SUPPLY SOURCE AND MARKET



Source: E. M. Hoover, The Location of Economic Activity (New York: McGraw-Hill, Inc., 1948), p. 30.

Review and Discussion of Literature

It has generally been agreed that most of the trends in Canadian agriculture and the parameters which influence its development closely parallel the situation in the agribusiness sector in the United States. In agreement with MacEachern, the following discussion of recent research endeavours considers agriculture in a North American context.[1]

Considerable research has been concerned with the North American transportation system, insofar as it has affected the development of agriculture. A traditional academic conclusion suggests that transportation plays a key role in the location of agricultural production and in marketing. Williams and Stout maintain that transportation, inter-area communication, in-transit product preservation and quality standards are interdependent and that these have given the United States many of the characteristics of a single market. The interdependence has encouraged agricultural prices to approach the perfect market standards, such that price differences between markets tend to approximate the costs of transfer between them.[2] There are exceptions to this rule, however, in the Canadian context. Williams and Stout consider the absolute level of transportation rates important in determining the geographical location of production, since length of haul to market has generally risen for all farm products owing to technological advance in transportation.[3] The

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[1] G. A. MacEachern, Prospects for Beef, Pork and Grain Production in Canada, Three Papers (Ottawa: Agricultural Economics Council of Canada, 1969), p. 64.

[2] W. F. Williams and T. T. Stout, Economics of Livestock-Meat Industry (New York: MacMillan Company, 1964), pp. 313-134.

[3] Ibid., pp. 319, 322.

traditional view of transportation is exemplified in the following statement:

> Transportation rate structures ... are among the principal determinants of the location of processing facilities. Freight rates and dressing percentages, shrinkage and other forms of weight loss on livestock, for instance, have largely determined the location of the meat packing industry.[1]

A more recent transportation study, however, takes a different view. Wilson and Darby argue that, while the essentials of the Williams-Stout viewpoint may be correct, it is easy to exaggerate the importance of transportation.[2] The causal nexus between freight rates and the extent of the market can be broken at many points in that price (perhaps), quality, nature of the commodity, sales effort, tastes, and preferences need not necessarily be tied rigidly to freight rates. Even the importance of freight rates relative to price varies substantially among commodities. These authors conclude that: "The grand transport mystique is therefore largely false as a generalisation."[3]

Wilson and Darby also explain the peculiarities of the Canadian transportation situation, some of which have influenced, to some extent, the location of the beef packing industry. There is an imbalance in the directional flows by type of shipment. Prairie exports tend to be products of low value in relation to bulk, whereas goods from Eastern Canada have a higher value per pound shipped. This means that a higher transfer cost

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[1] Ibid., p. 325.

[2] G. W. Wilson and L. Darby, Transportation on the Prairies, Supporting Study No. 2 (Indiana: prepared for the Royal Commission on Consumer Problems and Inflation, 1968), p. 14.

[3] Ibid.

on finished goods is a smaller relative addition to the total delivered cost, as such goods command higher prices. In other words, the types of goods which constitute a large proportion of Prairie exports "bear" a lower proportion of the overheads of the transportation system as they will "bear" lower freight rates.[1] Such a situation still remains despite the advance in transportation technology, which has tended to be an equalising factor in regional competitive advantage and has, no doubt, been partially responsible for the locational shift of the meat packing industry to Western Canada. The literature does not tend to emphasize causation in the opposite direction--that, in fact, the demand for rolling stock on a particular route and the volume of traffic will determine the level of freight rates. The influence of the transportation system from this point of view is discussed in Chapter Three of this study.

The relationship between the livestock-meat industry and the production of grain has been documented by the work of the Agricultural Economics Research Council of Canada.[2] The general conclusion from the literature appears to be that beef production tends to be the most supply oriented of all the livestock enterprises.[3] It is further explained that in the past the beef slaughtering and packing industry has tended to follow cattle production, although such adjustments have frequently lagged considerably.[4]

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[1] Ibid., p. 1.

[2] T. C. Kerr, An Economic Analysis of the Feed Freight Assistance Policy (Ottawa: Agricultural Economics Research Council of Canada, September, 1966), p. 34; see also, M. L. Lerohl, G. A. MacEachern and H. Vandermeulen, Grain and Feed Transportation Benefits and Burdens (Ottawa: Agricultural Economics Research Council of Canada, February, 1970), pp. 1-3.

[3] Kerr, op. cit., pp. 33-34.

[4] Williams and Stout, op. cit., pp. 82-83.

One reason for such lags is that the investment in packing plant equipment is not easily nor quickly transferable to another location. short run immobility of fixed investment helps to explain interregional shipments of livestock in Canada to obtain a balance between consumption demand, marketings for slaughter and actual slaughter. With regard to the American beef packing industry, Butz and Baker have commented that the construction of smaller, specialised plants would appear to suggest that the economies of size in packing and processing are only moderate.[1] The benefits of economies of scale are unlikely to be captured if the industry's capacity is under-utilised, a feature which has been historically evident both in the United States and in Canada. This problem, with its contribution to operational inefficiencies in meat packing, has received attention in recent years.[2] Some studies have concluded that under-utilisation of facilities may place a greater burden on larger plants with higher overheads.

Related to the capacity utilisation problem are the relatively moderate capital requirements needed to enter the packing industry,[3] which have contributed to the growth of smaller, independent packers in the North American meat packing industry. In addition, the use of federal grading systems has allowed buyers to select meat without

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[1] D. E. Butz and G. L. Baker, Jr., The Changing Structure of the Meat Economy (Boston: Harvard University Graduate School of Business Administration, 1960), p. 69.

[2] Nicholson, op. cit., p. 90; Bronson, op. cit., p. 15; Management Research Associates, Oregon, op. cit., p. 214, Child, op. cit., pp. 6-7.

[3] A.J.E. Child, Economics and Politics in U.S. Banking and Other Essays (Saskatoon: Midwest Litho Ltd., 1965), p. 107; see also, Appendix D, Table D.4.2.

visiting many distant packing houses, since they are assured that graded meat is of standard quality. Such a development has also favoured the expansion of meat sales from smaller, independent packing firms.

A feature of all the cited literature is the lack of a definitive and penetrating analysis of the industry's costs of operation and its operational efficiency. The blame for this omission must be shared both by researchers, many of whom the industry feels are merely casual observers with inappropriately designed projects,[1] and also by the meat packers themselves, who are still reluctant to divulge the necessary information for such an analysis. In most of the literature cited above, there is a constant lament that "available data are inadequate for a thorough review of changes in operational efficiency, regional differences, or differences by size or type of plant."[2] On the subject of costs, Williams and Stout have presented the most detailed data. Other sources of information can be found in two reports of government enquiries concerning the meat packing industry in Canada.[3] The information that is available is generally too highly aggregated to facilitate a precise analysis for any particular region or sector of the industry.

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[1] H. K. Leckie, "Canada's Meat Packing Industry" in "Canada's Beef Industry. Proceedings of the Canadian Agricultural Economics Society, Banff, Alberta, June, 1970," Canadian Journal of Agricultural Economics (Edmonton, Alberta: CAES, 1970), p. 21.

[2] Williams and Stout, op. cit., p. 368.

[3] Ibid., pp. 366-373, 619-347; also, Canada, Department of Justice, Restrictive Trade Practices Commission, Report Concerning the Meat Packing Industry and the Acquisition of Wilsil Ltd. and Calgary Packers Ltd. (Ottawa: Queen's Printer, 1961); Special Joint Committee of the Senate and House of Commons on Consumer Credit, Submission and Exhibits by Canada Packers Ltd. Hearing No. 16, Tuesday, November 8, 1966, Witness, W. F. McLean (Ottawa: Queen's Printer, 1967.)

Summary

In the Canadian situation the variables to be considered in a choice of beef packing plant location are likely to involve a substitution among all inputs, as Isard has suggested. For example, a plant must decide whether to pay more for procurement of cattle, or whether to pay more for the transportation of the finished beef products over the long distances between the Prairies and the consumption markets. It will constantly seek the least cost combination of such outlays. Of particular importance is the relationship between the density of material supplies, the extension of plant supply areas, and collection or procurement costs. Internal plant economies are probably relevant to an explanation of the problems of capacity utilisation and its effect on operational costs.

Assuming that few problems are encountered in the availability of variable inputs such as slaughter cattle, the technology of the meat packing industry is probably such that the capital required to enter the industry is moderate. Similarly, the economies of scale are captured at moderate levels of output. If, however, there are shortages of variable inputs the firm may be forced to operate on the portion of its short run average cost curve which is still declining--in other words, it may be unable to reach the minimum point on the curve which represents the minimum cost output. For example, the consequent lack of sufficient units of output may mean that fixed costs cannot be reduced to a minimum per unit of output.

The impact of government policy may be an additional factor affecting the choice of packing plant location. This has not been discussed by the literature in much detail. The establishment of the Department of Regional Economic Expansion in 1969 and the impact of its programme on the meat packing industry in Canada merits examination.

CHAPTER III

THE COMPETITIVE POSITION OF THE CANADIAN PROVINCES WITH RESPECT TO THE BEEF INDUSTRY

Factors Which Influence the Choice of Location of a Beef Packing Plant

The objective of this chapter is to consider factors affecting the locational advantage of Alberta to beef packing plants. Criteria on which a choice of location could be made might include the following considerations:

1. The availability of an adequate supply of slaughter cattle at the proposed location.

2. The availability of supply of a high and consistent quality.

3. The number of beef animals marketed during the year in the area of the proposed plant location.

4. The number of cattle on feed and feeder cattle purchases.

5. The number of beef cattle on farms. (Points 3, 4, and 5 will affect a packing firm's expectation of the continuity of future slaughter supplies for a plant.)

6. The level and distribution of consumer demand for beef in relation to the proposed plant location.

7. The transportation system, including transportation technology and the freight rate structure, both of which may affect the ability of a beef packing plant to distribute its products to consumption centres.

8. Costs of shrinkage on livestock and beef products in transit.

Supply Considerations

Slaughter Supply

The first problem is the estimation of beef cattle output potentially available for slaughter by province of origin, to the beef sector of the meat packing industry in Canada. Statistics Canada data for inspected and uninspected slaughter were used (Appendix A, Table A.3.1, p.139).[1] To obtain more accurate estimates of provincial output, the total slaughter figures, as shown in Table 3.1, must be adjusted to account for interprovincial movements on livestock and imports and exports of livestock and beef products. Published data on slaughter figures in this form are not directly available.

To estimate the output, the number of head slaughtered in Alberta, Saskatchewan, and Manitoba were added to give total Prairie slaughter for each year and the percentage share of each province in this total was calculated. On the basis of the relative shares in the Prairie slaughter, estimates were made of the slaughter cattle exports originating in each Prairie Province shipped to Ontario, Quebec and the Maritimes (excluding Newfoundland), hereafter referred to as Eastern Canada. The relevant numbers of head were subtracted from Eastern Canada's beef cattle slaughter and were added to output in each of the Prairie Provinces. Table A.3.2 in Appendix A shows the numbers of cattle involved. It also indicates that the beef industry in the Prairies supplies not only cattle for immediate slaughter, but also

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[1] Statistics Canada, op. cit. (See footnote 1 page 4 of this study.) Table numbers preceded by "A" are all included in Appendix A.

TABLE 3.1

TOTAL NUMBER OF CATTLE SLAUGHTERED BY PROVINCE 1960-1971

Year	Maritimes[a]	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Canada
1960	60,112	315,390	764,118	366,781	114,695	468,531	123,770	2,213,403
1961	67,565	286,292	763,916	393,583	131,510	561,873	111,234	2,315,973
1962	71,701	301,736	814,841	328,581	123,769	589,466	96,365	2,326,459
1963	69,108	304,392	858,128	335,883	126,672	632,093	96,740	2,423,016
1964	73,482	325,347	946,541	397,831	145,687	714,984	101,888	2,705,760
1965	83,489	362,097	1,068,233	477,420	162,443	772,674	111,758	3,045,114
1966	79,204	298,253	1,021,122	471,207	181,906	846,669	123,878	3,022,239
1967	68,200	274,907	961,536	457,990	157,184	878,419	118,552	2,926,788
1968	68,721	301,429	978,419	475,566	170,237	935,131	134,426	3,063,929
1969	64,412	291,516	1,056,449	435,685	174,811	892,775	136,147	3,051,795
1970	62,561	299,929	1,028,773	429,436	166,545	922,820	96,370	3,006,434
1971	66,930	257,528	1,048,001	432,396	167,322	1,048,067	68,564	3,088,808

[a] Does not include Newfoundland.

Source: Statistics Canada, Handbook of Agricultural Statistics Part VI: Livestock and Animal Products Statistics, 1871-1905, Cat. No. 21-508 (Ottawa: Queen's Printer, November, 1966).

__________, Livestock and Animal Products Statistics, Cat. No. 23-203 (Ottawa: Queen's Printer, 1960-1970).

__________, Livestock Estimating Unit, Agriculture Division (unpublished data, Ottawa, 1972).

a substantial number of feeder livestock (mostly calves) and other animals destined for Eastern stockyards. This gives an initial indication of the annual livestock surplus in the three western provinces. Since Alberta also exports live cattle to British Columbia, it was assumed that all live imports into British Columbia are from Alberta.[1] Estimates of interprovincial cattle movements are crude and, at best, informed guesses since the data available are incomplete. Table A.3.3 in Appendix A shows the estimated cattle flows from Alberta to British Columbia.

The final adjustment made to the total slaughter cattle output attempted to account for exports and imports both of beef cattle and of fresh, chilled or frozen beef products. To simplify the calculations net figures were used. Crude estimates of provincial beef consumption were made using the national average per capita consumption figures and provincial population trends over the period. The demand estimates were then compared with the figures in Table 3.1 showing total slaughterings by province. On the evidence that the Maritimes, Quebec, Ontario and British Columbia are deficit regions for beef production, any net imports of beef or livestock were allocated among these regions according to their relative shares in the total annual deficit and subtracted from their total supplies. Any net exports were allocated

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[1] Canada Department of Agriculture, Annual Livestock Market Reports from Edmonton, Calgary and Lethbridge Public Stockyards (Edmonton, Calgary and Lethbridge: Canada Department of Agriculture, Livestock Division, 1969-1971); also, British Columbia Department of Agriculture, The Beef Cattle Industry of British Columbia (May, 1969). The stockyards reports and the British Columbia Report indicate that livestock flows from Saskatchewan are insignificant and intermittent. The latter report does show, however, that 1,855 cattle were moved in 1963 and 991 head were moved in 1965. These are taken into account in the calculations.

among the three Prairie Provinces and added to their estimated cattle output for beef production. Table 3.2 shows the estimated annual provincial output of beef with all the above adjustments included. Reference to Table A.3.4 shows the crude estimates of provincial beef consumption, while Tables A.3.5, A.3.6, and A.3.7 show the size of the export and import flows involved.

Table 3.2 shows that, since 1965, Alberta's beef production is the largest in Canada. In 1971, an estimated 628,625 million pounds were produced. In 1971, Manitoba produced 258,203 million pounds; Saskatchewan, 99,919 million pounds; and Ontario, 551,900 million pounds. Nevertheless, the relative competitive strength of the Prairies in livestock production, in terms of available supplies, is evident from estimated surpluses and deficits by region in beef production (Table 3.3). Table A.3.8 gives some indication of the difficulty in estimating provincial slaughter cattle numbers. Inaccuracy may alter the size of the surplus or deficit by region.

To estimate the surplus or deficit in each province, available supply (after all adjustments were made) minus local demand was calculated. It is expected that the deficits in Eastern Canada will not continue to increase at such a rapid rate since absolute population increases are expected to be reduced with increasing population density.[1]

An adequate volume of slaughter supply, however, is not the only factor which a packing company will consider in its choice of plant

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[1] Nicholson, op. cit., p. 5; also Lerohl, MacEachern and Vandermeulen, op. cit., p. 58.

TABLE 3.2

PROVINCIAL BEEF OUTPUT ADJUSTED FOR INTERPROVINCIAL MOVEMENTS OF LIVESTOCK FOR SLAUGHTER AND FOR IMPORTS AND EXPORTS OF LIVESTOCK AND FRESH, CHILLED OR FROZEN BEEF, 1960-71[a]

Year	Maritimes	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Canada[c]
				('000 pounds)				
1960	30.176	134.663	368.133	259.304	81.102	350.576	45.589	1,269.445
1961	34.025	132.652	376.435	315.524	105.440	470.061	39.416	1,473.553
1962	37.223	148.487	415.564	252.524	95.119	472.251	31.792	1,452.961
1963	35.980	151.402	448.857	226.270	86.354	446.417	30.395	1,425.674
1964	37.635	162.391	483.890	255.546	93.569	478.979	35.501	1,547.512
1965	42.510	177.523	533.651	388.916	132.831	651.524	42.328	1,969.284
1966	41.229	145.122	514.817	358.335	138.302	665.534	45.915	1,909.254
1967	35.857	130.356	489.110	294.158	107.385	581.555	47.881	1,686.311
1968	37.830	148.884	504.778	330.981	118.465	671.023	55.029	1,855.802
1969	26.807	115.389	530.800	275.504	110.543	587.527	41.217	1,687.788
1970	27.929	133.603	522.125	264.789	102.686	582.799	29.329[b]	1,663.261
1971	35.997	130.367	551.900	258.203	99.919	628.625	32.771	1,741.111

[a] The numbers of cattle slaughtered in each province were converted to millions of pounds using the average warm dressed weights of inspected slaughter as reported by the Canada Department of Agriculture. The weights were: 523.6 lbs. in 1960, 530.2 in 1971, 529.5 in 1962, 542.7 in 1963, 542.1 in 1964, 530.7 in 1965, 545.5 in 1966, 550.1 in 1967, 559.4 in 1968, 566.0 in 1969, 573.4 in 1970, and 569.2 in 1971. It was assumed these figures would not vary significantly for uninspected slaughter.

[b] Closure of many smaller slaughter plants in British Columbia and the consequent shipment of Alberta dressed beef account for this total. See note c, Table A.3.1, p. 139

[c] Provincial totals do not add to Canada total because of rounding errors and the non-inclusion of Newfoundland the North West Territories.

Source: Calculated from Statistics Canada, Livestock and Animal Products Statistics, Cat. No. 23-203 (Ottawa: Queen's Printer, 1960-1970); also, Canada Department of Agriculture, Annual Livestock Market Review (Ottawa: Queen's Printer, 1960-1971).

TABLE 3.3

BEEF PRODUCTION ESTIMATED SURPLUS (+) AND DEFICIT (-) BY REGION, 1960-1971

Year	Maritimes	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia[a]	Canada
				('000 pounds)				
1960	- 69.154	-225.277	- 59.637	+195.884	+17.052	+260.206	- 66.651	+ 18.545
1961	- 67.495	-238.108	- 63.203	+250.523	+40.227	+376.155	- 75.429	+187.774
1962	- 66.441	-233.391	- 35.992	+185.974	+28.996	+374.915	- 86.234	+131.710
1963	- 73.092	-255.835	- 32.681	+155.759	+17.032	+342.174	- 95.841	+ 19.101
1964	- 79.480	-280.979	- 42.611	+179.401	+18.774	+365.516	-103.052	+ 15.886
1965	- 81.218	-297.743	- 33.826	+308.242	+53.411	+530.304	-107.901	+327.046
1966	- 83.407	-341.060	- 70.603	+277.347	+57.986	+542.496	-111.688	+225.993
1967	- 88.967	-362.556	-111.406	+213.266	+26.913	+456.395	-115.667	- 27.709
1968	- 93.194	-370.914	-135.958	+245.824	+34.273	+537.193	-120.985	+ 36.554
1969	-105.317	-412.400	-126.466	+189.156	+25.959	+499.847	-144.902	-169.792
1970	-100.621	-381.711	-132.366	+180.717	+21.957	+455.679	-153.812	-168.747
1971	- 95.483	-393.640	-127.224	+172.346	+19.276	+486.630	-158.061	-142.968

[a] See Table A.3.8, p. 145

Source: Calculated from: Statistics Canada, Livestock and Animal Products Statistics, Cat. No. 23-203 (Ottawa: Queen's Printer, 1960-1970); Canada Department of Agriculture, Annual Livestock Market Review (Ottawa: Queen's Printer, 1960-1971); Statistics Canada, Canada Year Book (Ottawa: Queen's Printer, 1965, 1970-1971).

location. Beef cattle output of a high and consistent quality is also important. Table 3.4 indicates that, in 1971, almost 75 percent of the beef carcases in federally inspected packing plants in Alberta were graded choice and good. In 1971 the choice and good grades accounted for 66.1 percent of beef carcases graded in Ontario and for 7.4 percent of beef carcases graded in Quebec. The latter figure can be explained by the fact that much of the cattle slaughter in Quebec is from dairy cattle breeds.[1] In Alberta 63.3 percent of the beef carcases graded were choice and good in 1963, compared with 56.9 percent in Ontario and 11.7 percent in Quebec. The consistently high quality of Alberta's beef cattle supply is also apparent from the data for intervening years.[2] The continued demand from Eastern Canada for Alberta beef suggests a consumer preference for high quality meat.[3] The meat packers can service this demand by locating beef packing plants in Alberta.

The Supply Inventory

Trends in other variables which affect packing plant procurement are also likely to be relevant. Of importance are total provincial cattle marketings, purchases of feeder cattle and the numbers of cattle on farms by province. Table 3.5 presents total cattle marketings in Canada from 1960 to 1971 and shows shifts in the cattle industry which emphasize the

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[1] See Table 3.6, p.45 of this study.

[2] Canada Department of Agriculture, Annual Livestock Market Review (Ottawa: Queen's Printer, 1964-1970).

[3] M. H. Hawkins and T. W. Manning, A Study of the Montreal Wholesale Beef Trade, Research Bulletin 7 (Edmonton: University of Alberta, Department of Agricultural Economics and Rural Sociology, March, 1970), p. 4.

TABLE 3.4

BEEF: NUMBER AND PERCENTAGE OF CARCASES GRADED IN FEDERALLY INSPECTED PACKING PLANTS, 1963 AND 1971[a]

Grade	Atlantic Provinces		Quebec		Ontario		Manitoba		Saskatchewan		Alberta		British Columbia		Canada	
	1963	1971	1963	1971	1963	1971	1963	1971	1963	1971	1963	1971	1963	1971	1963	1971
Choice	451	1,079	13,002	9,529	312,471	456,754	79,315	167,549	34,733	56,296	295,974	520,304	43,246	23,211	799,122	1,234,722
Percentage[b]	1.3	2.9	6.2	4.8	41.2	49.9	23.9	39.4	29.9	36.1	48.8	51.2	60.7	59.0	36.7	44.3
Good	1,863	2,693	11,394	5,213	118,769	148,135	73,196	98,203	27,980	47,471	88,094	234,328	7,465	5,174	328,761	541,217
Percentage	5.2	7.3	5.5	2.6	15.7	16.2	22.1	23.1	24.1	30.5	14.5	23.1	10.5	31.1	15.5	19.4
Standard	5,331	4,978	8,030	3,743	66,219	76,608	40,404	29,594	12,600	11,915	44,553	56,222	4,113	2,452	181,250	185,512
Percentage	15.0	13.5	3.9	1.9	8.7	8.4	12.2	7.0	10.9	7.6	7.3	5.5	5.8	6.2	8.5	6.7

[a] By province in which graded.

[b] Grades are expressed as a percentage of the total number of carcases graded in each province.

Source: Canada Department of Agriculture, Annual Livestock Market Review (Ottawa: Queen's Printer, 1963, 1971).

TABLE 3.5

CATTLE MARKETINGS BY PROVINCE OF ORIGIN DELIVERED TO PUBLIC STOCKYARDS AND PACKING PLANTS AND SHIPPED DIRECT ON EXPORT

Year	Maritimes	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Canada[a]
				(number of head)				
1960	28,269	105,446	736,908	230,307	453,827	813,344	60,740	2,428,841
1961	36,304	108,967	751,054	290,638	564,805	871,044	62,238	2,685,050
1962	46,191	122,260	845,133	219,888	496,766	869,978	64,295	2,676,511
1963	35,219	125,158	882,333	256,933	456,039	858,806	58,805	2,673,293
1964	42,076	140,122	946,144	289,726	521,701	959,365	54,435	2,953,569
1965	53,758	162,540	1,077,758	362,788	686,202	1,153,163	98,591	3,595,114
1966	47,643	122,592	990,861	349,138	674,313	1,196,790	84,794	3,466,862
1967	89,698	110,813	919,802	329,850	632,287	1,170,417	47,331	3,270,880
1968	33,879	117,982	987,396	318,508	595,909	1,288,631	78,314	3,421,014
1969	35,506	141,564	997,787	294,211	518,930	1,235,273	67,201	3,293,618
1970	39,317	177,868	942,438	316,783	511,218	1,177,680	41,859	3,207,386
1971	40,908	171,700	968,801	304,850	537,282	1,227,574	42,344	3,293,692

[a] Provincial totals do not add to the Canadian totals because Newfoundland is not included.

Source: Canada Department of Agriculture, Annual Livestock Market Review (Ottawa: Queen's Printer, 1960-1971).

increasing importance of the Prairie Provinces and Alberta in particular (also see Figure 3.1). In 1971 Alberta accounted for 37.2 percent of the total Canadian beef cattle marketings. The figures for 1970 and 1969 were 36.7 and 37.5 percent, respectively. Ontario marketed 29.4 percent in 1971, 29.4 and 30.3 percent in 1970 and 1969. The Prairies' share of total cattle marketings was 62.83 in 1971 and 62.28 percent in 1969. The number of cattle marketings in each province appears to have been an important consideration affecting the choice of locations for packing plants in Western Canada over the last decade.

The feeder cattle sector is a sub-sector of cattle marketings which has an effect on available slaughter supply by province of origin. Table A.3.9 (p. 146) shows feeder cattle purchases by province over the last decade. The totals have been rising steadily in Alberta, reaching record numbers in 1971. Reference, at the same time, to Table A.3.2. (p. 140) indicates that fewer feeders are consequently being shipped East by rail. Correspondence with representatives of the meat packing firms indicated that they observed trends in the location of feeder cattle with attention in an effort to locate near the larger commercial feeding enterprises.

The explanation behind the rising cattle marketings is the increase in the numbers of cattle on farms in Canada. The relative distribution of various sectors of the livestock industry also helps to account for the surpluses and deficits in livestock production for beef. In Quebec, for example, the dairy industry is relatively more important than beef (Table 3.6).

FIGURE 3.1

CATTLE MARKETINGS BY PROVINCE OF ORIGIN 1960-1971

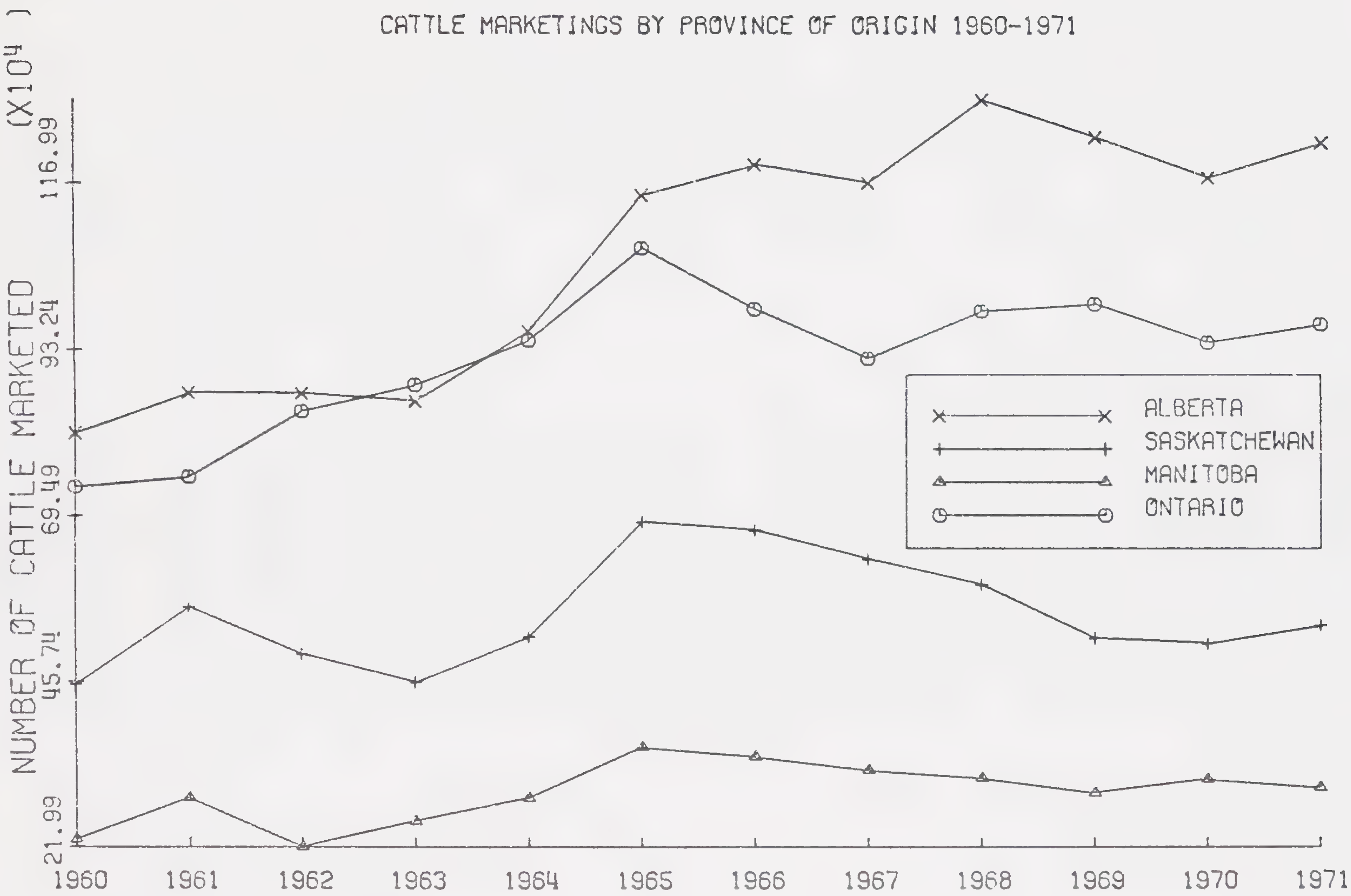

TABLE 3.6

CATTLE NUMBERS ON FARMS EXCLUDING DAIRY ANIMALS COMPARED WITH TOTAL NUMBERS ON FARMS, (JUNE 1) 1960-1971

Year	Maritimes	Maritimes Total	Quebec	Quebec Total	Ontario	Ontario Total	Manitoba	Manitoba Total	Saskatchewan	Saskatchewan Total	Alberta	Alberta Total	British Columbia	British Columbia Total	Canada	Canada Total
	('000 head)															
1960	261.5	437.0	902.0	1,911.0	1,997.0	2,972.0	732.7	931.0	1,719.0	1,956.0	2,418.0	2,697.0	342.0	433.0	8,372.2	11,337.0
1961	274.1	445.0	908.5	1,915.2	2,123.3	3,115.7	799.6	995.5	1,880.0	2,121.1	2,591.5	2,879.4	369.9	461.8	8,946.9	11,933.7
1962	275.5	440.0	921.0	1,938.0	2,278.0	3,274.0	797.0	982.0	1,855.0	2,084.0	2,617.0	2,899.0	385.0	477.0	9,128.5	12,067.0
1963	279.0	435.0	929.0	1,947.0	2,258.0	3,204.0	891.0	1,006.0	1,965.0	2,174.0	2,755.0	3,035.0	415.0	504.0	9,492.0	12,365.0
1964	282.0	435.0	914.0	1,930.0	2,294.0	3,243.0	980.0	1,152.0	2,189.0	2,379.0	3,041.0	3,320.0	449.0	535.0	10,149.0	12,994.0
1965	288.0	439.0	884.0	1,904.0	2,316.0	3,252.0	1,021.0	1,184.0	2,279.0	2,451.0	3,204.0	3,473.0	473.0	557.0	10,465.0	13,260.0
1966	267.4	409.3	802.3	1,797.6	2,228.3	3,137.0	1,001.0	1,151.2	2,244.2	2,398.0	3,196.7	3,439.7	464.9	546.0	10,204.9	12,878.8
1967	264.0	399.0	792.0	1,796.0	2,240.0	3,165.0	970.0	1,112.0	2,223.0	2,368.0	3,170.0	3,405.0	454.0	536.0	10,113.0	12,781.0
1968	260.6	392.0	824.0	1,847.0	2,315.0	3,220.0	904.0	1,037.0	2,096.0	2,223.0	3,107.0	3,322.0	443.0	525.0	9,949.6	12,566.0
1969	258.0	386.0	852.0	1,895.0	2,309.0	3,204.0	896.0	1,019.0	2,063.0	2,180.0	3,182.0	3,380.0	444.0	522.0	10,004.0	12,586.0
1970	258.4	382.0	899.0	1,945.0	2,292.0	2,162.0	1,002.0	1,120.0	2,271.0	2,386.0	3,337.0	3,535.0	450.0	530.0	10,509.4	13,060.0
1971	260.0	378.0	936.0	1,958.0	2,278.0	3,118.0	1,071.0	1,190.0	2,520.0	2,643.0	3,620.0	3,825.0	468.0	548.0	11,153.0	13,660.0

Source: Statistics Canada, Livestock and Animal Products Statistics, Cat. No. 23-203 (Ottawa: Queen's Printer, 1960-1970); also Statistics Canada, Livestock Estimating Unit, Agriculture Division (unpublished information, Ottawa, 1972).

If the trends in provincial cattle numbers are compared, it can be seen that the greatest increase in the ratio of beef to dairy cows has occurred in the three Prairie Provinces, suggesting an increasing competitive advantage in beef production. Cattle, not including milk cows, represented 73.8 percent of the total numbers of cattle on farms for Canada as a whole in 1960 and 81.6 percent in 1971. In 1960, in Manitoba, Saskatchewan, and Alberta beef cattle represented 78.7, 87.9 and 90.0 percent, respectively, and 90.0, 95.3, and 94.6 percent in 1971. An important reason as to why this is the case is emphasized by Kerr. He points out that not only is space at a premium in the more densely populated areas of Eastern Canada, making the more intensive forms of agricultural production relatively attractive; but also, that beef cattle production is suited to Prairie conditions, since adequate land areas for forage production and expansion are still available.[1] Essentially the same influences on the locational distribution of beef cattle production have been isolated by Lerohl, MacEachern, and Vandermeulen.[2] In both studies, the interdependence between the livestock and feed grain sectors of Canadian agriculture is emphasized.

Demand for Beef

The distribution of demand in relation to location of production is one of the factors likely to affect the choice of plant site. The initial estimates of provincial demand for beef, using average

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[1] T. C. Kerr, op. cit., p. 35.

[2] Lerohl, MacEachern and Vandermeulen, op. cit., p. 21.

Canadian per capita consumption figures, were modified by an analysis of consumer demand which utilised regression techniques. This represents an attempt to account for variations in provincial beef consumption per capita, which could be explained by provincial differentials in per capita personal disposable income.

The Method

A demand function for beef was estimated for Canada for the period 1960 to 1971 using annual, average Canadian per capita consumption data; the all-items consumer price index; consumer price indices for beef and pork; personal disposable income and population as reported by Statistics Canada. Pork only was considered as the principal red meat substitute for beef since consumption of veal and sheep meats has been declining.[1] The annual income data were deflated by the general consumer price index and were converted into per capita form. The general consumer price index was also used to deflate the beef and pork price indices. The results of the Canadian regression were used to estimate annual per capita beef consumption for each of the major provinces and for the Maritimes over the period 1960 to 1971. The data and the procedure used are outlined in Appendix B, page 147. Table 3.7 shows the estimated provincial per capita beef consumption levels.

The analysis of provincial demand for beef suggested that the areas already deficient in beef production, that is, Quebec, Ontario, the Maritimes and British Columbia, are likely to experience increasing

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[1] Statistics Canada, Estimates of Production and Disappearance of Meats, Cat. No. 32-220 (Ottawa: Queen's Printer, 1960-1971).

TABLE 3.7

ESTIMATED PER CAPITA CONSUMPTION OF BEEF BY PROVINCE, 1960-1971[a]

Year	Maritimes	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Canada
				(lbs.)				
1960	53.3	63.0	79.7	70.3	65.9	70.0	78.9	70.0
1961	55.8	66.4	81.4	69.1	54.4	71.5	80.3	70.5
1962	52.8	64.0	79.7	70.6	67.7	70.4	77.8	71.1
1963	56.7	67.6	84.8	72.5	76.0	74.8	82.6	74.3
1964	61.1	72.6	88.8	77.8	69.7	78.7	87.5	79.4
1965	64.1	77.4	93.5	81.1	78.3	83.4	92.3	83.6
1966	65.1	78.7	95.7	82.4	83.4	85.5	93.3	84.1
1967	64.3	77.4	93.7	83.0	73.0	83.4	90.0	84.0
1968	67.3	79.3	95.5	87.7	80.9	85.7	90.5	87.7
1969	68.9	80.8	97.3	86.7	81.2	87.0	91.3	88.2
1970	70.2	81.5	97.3	86.5	71.3	87.0	91.3	85.7
1971	70.6	83.1	98.0	85.6	73.5	88.0	91.3	86.9

[a] Estimated by the regression technique.

beef deficits on account of the rising trends both in population and personal disposable income in these provinces. Also, compared with Western Canada, they have limited potential in terms of land use availability for expanding beef production. In 1960, the population of Eastern Canada (excluding Newfoundland) was 70.9 percent of the Canadian population, while 17.9 percent resided in the Prairie region. By 1971, population distribution still showed the same imbalance with 70.8 percent in the East and 16.4 percent in the Prairies. When considering Western Canada, however, the balance is altered, since the population of British Columbia is expanding at a more rapid rate. The Agricultural Economics Research Council reached similar conclusions.[1]

The Transportation System

Technology

From the preceding analysis in this chapter, it appears that the Prairies will continue to distribute surplus livestock and beef products to the deficit areas. Interprovincial trade, however, is affected by the transportation system. The Weberian analysis concluded that a weight-reducing process, such as livestock slaughter, would locate at the place of production.[2] This is applicable to the Canadian situation, since it is more economical to ship higher value dressed meat products to Eastern Canada than to ship livestock. In addition, deaths, damage and tissue shrink make the shipment of livestock more risky. A constraint on this result for the meat packing industry in

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[1] Lerohl, MacEachern, and Vandermeulen, op. cit., p. 65.

[2] See p. 24 of this study.

Canada is the state of transportation technology, since beef is a perishable commodity which must be moved over long distances to reach the consumer. The last ten years have been a period of technological advance in refrigerated transportation and the trend is continuing. For example, late in 1970, both Canadian National and Canadian Pacific Railways planned to increase their number of mechanical refrigerated cars, while phasing out the older, manually iced cars.[1] In addition, it appears that there are considerable savings involved with the use of the new cars; about 50 cents per 100 pounds shipped from Calgary to Eastern Canada and 38 cents per 100 pounds shipped from Winnipeg to Eastern Canada.[2] Technological advance has been a major factor in explaining the ability of meat packing plants to locate farther from the consumer and nearer the sources of supply. To discover possible economic motives for doing so, however, necessitates a discussion of transportation rates and the transfer problems of the beef packing industry.

The Freight Rate Structure

It has been suggested that the freight rate structure has some influence on whether surplus Prairie production will be shipped in the form of dressed beef and processed meat products, or in the form of livestock.[3] Together with present patterns of population distribution regional livestock production, and topography, the Canadian transportation

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[1] M. H. Hawkins and T. W. Manning, op. cit., p. 3.

[2] Ibid.

[3] G. C. Carlson, "Transportation Costs as a Factor in the Competitive Position of Livestock Slaughter Plants in the Prairie Region of Canada" (unpublished M.Sc. thesis, University of Saskatchewan, 1964), p. 1.

system can help to explain the spatial location of economic activity. The study of G. W. Wilson and L. Darby has been used as a basis for the discussion.[1]

First, the Prairies are geographically isolated in terms of distance from Eastern Canadian and many export markets. Second, their population is relatively small, about 17 percent of the Canadian population, and is of low density in relation to the size of the region which results in low density transportation lines. Freight charges, therefore, tend to be a higher proportion of commodity delivered prices in the Prairies than in Eastern Canada. Also, Prairie producers may receive lower net receipts than producers located near the market.

The railways still retain a large share of the Prairie interprovincial traffic, but recent road improvements have led to increasing competition from road hauliers. The situation is reflected in many rail tariffs. For example, the Canadian Freight Association Tariff 116-E (which refers to the movement of livestock from the Prairies to Eastern Canada) contains the clause common to several current rail tariffs: "competitive rates to meet motor truck competition." Some tariffs specify a number of free deliveries in an attempt to compete with more flexible trucking delivery services. A comment from the railways suggested that the trucking firms do not need to keep their rates below the rail rates on some routes, since the flexibility of

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[1] Wilson and Darby, op. cit., pp. 1-5.

truck operations may be superior to that of the railways in that the latter are unable to service the needs of particular customers.[1]

Trucks, however, tend to be most competitive for shorter hauls and for distances up to about 500 miles, since the routing is flexible and the terminal charges are low. For longer hauls, the advantage shifts to the railways because of their lower line haul charges. Interprovincial long-haul movement of goods by truck is characterised by "back-hauls". Any operating losses on cargoes originating in the Prairies may be covered by the movement of predominantly manufactured goods more suited to truck carriage and of higher value, in relation to bulk, from East to West.

There is some disagreement between many academic researchers and railway executives as to the extent that the freight rate structure and transportation costs have influenced the location of the meat packing industry. Williams and Stout, for example, argue that the freight rate structure is a major determinant of the industry's location.[2] To accept this statement without qualification, however, is to ignore principles used in the setting of freight rates. For example, the railways can be assumed (in common with any other commercial enterprise) to be net revenue maximisers. The profit objective, sharpened by some

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[1] Competition may be less than might be expected since both the CNR and the CPR own major trucking companies. Midland Superior and CN Piggyback are controlled by the CNR while CP Transport and CP Piggyback are controlled by the CPR. The same point is noted by Wilson and Darby, op. cit., p. 47. They also quote an unpublished input-output analysis for the Alberta economy for 1962 by R. W. Wright. Local truckers tended to deliver most of the cattle between assembly points and farms to slaughter plants, Wilson and Darby, op. cit., p. 8.

[2] See pp. 27-28 of this study.

increase of truck competition, has provided an incentive to improve transportation technology and to actively seek business.

There are two examples which are relevant in this context. First, any shipper is able to negotiate with the railways for an agreed charge on some commodity(s) using specified routes. For this a guaranteed use rate is negotiated and it is usually between 90 and 100 percent of the shipper's output volume. If the volume of business is sufficiently substantial the railways will offer an agreed charge per unit, or carload, of product shipped, which is lower than the normal commodity rate or even the competitive rate for that category of goods.[1] Meat is a good example because the industry has traditionally handled large volumes. At the present time about 200-225 cars of beef go to the Montreal market each week.[2]

Second, the institution of "piggy back" services represents a railroad effort to regain some of the business lost to truckers. "Piggy back" offers speedy delivery on long hauls and reduced handling charges, yet retains the flexibility of door-to-door service. Loaded truck trailers are carried on railway flatcars. Discussions with the national packers, in particular, have suggested that this type of service has become important to the meat packing industry in Canada.

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[1] Canadian Freight Association Agreed Charge, August 1971, with Canada Packers and Dominion Provisioners: 308 cents per 100 pounds of meat shipped from Alberta to Toronto and Montreal on a carload minimum weight of 60,000 pounds. Refer to Table 3.8, page of this study; for the same route and minimum weight, the regular commodity rate is 349-350 cents per 100 pounds shipped.

[2] Hawkins and Manning, op. cit., p. 1.

The railways contend, therefore, that transfer charges are probably less influential than previously supposed, and, moreover, it is emphasized that there is always a railway rate on any commodity in any direction. Proof of profitability of the traffic proposed will determine whether a class, commodity or competitive rate, or an agreed charge is negotiated. Wilson and Darby also conclude that excessively high rate levels in relation to transport costs are not typical of the Canadian transportation system at the present time.[1]

The published rail freight rates for 1971-1972 for livestock and meat products are presented in Table 3.8. The impact of the rates, however, may be misleading since nearly all rates are negotiable depending on the type, regularity and density of traffic. It becomes more of a theoretical exercise than a valid discussion to compare the rates on various routes as being more or less favourable to livestock or meat shipments; inaccuracies also result. For example, the lower livestock rates between Edmonton, Calgary, and Winnipeg cannot be said to favour livestock shipment on these routes, for the heavy volume of traffic in meat between Alberta and Eastern Canada has resulted in the ability of the railways to increase minimum carload weights and to lower the rates per 100 pounds shipped and yet still retain a profit. Additional discounting of shrinkage costs on livestock in transit tends to favour slaughtering locations in close proximity to the highest density of cattle supplies. The influence of the multi-plant packing firms will also affect the flow of shipments depending

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[1] Wilson and Darby, op. cit., p. 54.

TABLE 3.8

RAIL RATES ON LIVESTOCK (CATTLE) AND ON MEATS (FRESH), 1971-1972[a]

(cents per 100 pounds)

From	To Vancouver	Edmonton	Calgary	Saskatoon	Regina	Winnipeg	Toronto	Montreal	Halifax
Vancouver		186	178	264	269	344	537	537	562
		263	250	384	384	468	901	901	929
Edmonton	186		90	119	148	187	358	358	473
	117		51	128	129	206	349	349	402
Calgary	178	90		114	143	136	359	359	478
	117	51		88	92	206	350	350	421
Saskatoon	264	119	114		85	143	324	324	417
	197	128	271		140	236	302	302	377
Regina	269	148	143	85		117	312	312	402
	444	245	236	140		206	280	280	357
Winnipeg	344	187	136	143	117		257	257	386
	571	131	131	89	66		224	224	306
Toronto	537	448	454	393	378	312		94	157
	901	720	685	610	578	479		169	240
Montreal	537	448	454	393	378	312	94		125
	901	720	685	610	578	479	187		191
Halifax	551	453	461	399	383	320	135	98	
	929	747	761	633	595	489	212	156	

[a] Livestock rates appear in the top row, meat rates (fresh or frozen beef), in the bottom row. Most of the beef packing plants in Alberta do not process their products to any great extent. These rates are the lowest published rates between any two points. In other words, where rates are higher, the minimum weights may refer to smaller carloads moving on that particular route. Some of these published rates refer to occasional hauls and some are hypothetical, eg. for meat moving from Halifax to Vancouver to provide a comparison only.

Source: Transport Research and Development Branch, Alberta Department of Industry and Tourism, (interviews, Edmonton, April, 1972) also, CNR and CPR (interviews, Edmonton, 1972).

on their attempts to regulate supplies of livestock or beef input at all plants. Livestock for slaughter moving to Ontario is probably ordered by meat packing firms with inadequate volume desiring to keep slaughter facilities in operation to offset some of their overhead costs.[1] Another explanation for the continuing movement of slaughter cattle to Montreal is the specific demand of the Kosher trade for high quality beef cattle.[2]

The trucking freight rates are difficult to determine, since the available published rates do not accurately reflect the extreme variability and flexibility of rates actually charged by individual truckers for specific hauls which may be singular, regular or intermittent. Table 3.9 shows published rates on meat. Rates were estimated on routes which are probably inoperative (for example, from Halifax to Vancouver) to provide a hypothetical comparison. Table 3.9 suggests that truck carriage is not usually economical for very long hauls. For livestock, cattle liner rates are published up to distances of 401 to 425 miles (Table 3.10). Consideration of shrinkage costs on livestock also tends to discriminate against truck haulage over longer distances unless there is some special negotiated arrangement.

Costs of Shrinkage

Shrinkage on livestock and meat is assumed to be the difference between the weight of the goods when they are loaded at origin and the

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[1] Comment from a meat packer. One national packer did admit that "the odd load" of live cattle was shipped East "from time to time."

[2] Hawkins and Manning, op. cit., p. 1.

TABLE 3.9

TRUCK RATES, BEEF PRODUCTS, 1972[a]

(cents per 100 pounds)

From \ To	Vancouver	Edmonton	Calgary	Saskatoon	Regina	Winnipeg	Toronto	Montreal	Halifax
Vancouver		166	166	244	244	305	521	521	671
Edmonton	166 175-180		50	89 90-95	95 120-125	159 190-195	355	355	505
Calgary	166	50		95	95	159 136	355	355	505
Saskatoon	244	89	95		55	114 185[b]	303	303	453
Regina	244	95	95	55 55-60		87 130[b]	281	281	431
Winnipeg	305	175	175	108	82		228	228	378
Toronto	466	368	368	393	362	250		145	214
Montreal	556	458	458	289	274	267	215		150
Halifax	706	608	608	439	423	417	214	150	

[a] Rates are the minimums published between any two points. Where the rates are higher, the truck load minimums are smaller. Where possible, fresh meat rates were used--suspended rates are higher than non-suspended. From East to West, the rates tend to apply on cooked, cured and processed meats. The underlined figures represent hypothetical calculations using combinations of rates from Vancouver and Halifax for comparison only.

[b] Per trailer, 20,000 lbs. minimum for cattle.

Source: Transport Research and Development Branch, Alberta Department of Industry and Tourism, (interviews, Edmonton, April, 1972).

TABLE 3.10

CATTLE LINER RATES (TRUCK) 1971-1972[a]

Miles	Between Stockyards in Towns and Cities	Delivery Points at Farms, Feed Lots, Etc.
	(cents per 100 lbs.)	
101-125	45	50
126-150	50	55
151-175	55	60
176-200	50	65
201-225	65	70
226-250	70	75
251-275	75	80
276-300	80	85
301-325	85	90
326-350	90	95
351-375	95	100
376-400	100	105
401-425	105	110

[a] These rates apply between points in the province of Alberta and destinations beyond.

Special cross country trips - $1.00 per loaded mile for 100 miles;
80 cents per loaded mile for additional miles;
minimum $25.00

Source: Transport Research and Development Branch, Alberta Department of Industry and Tourism (interviews, Edmonton, April, 1972).

off-car weight at final destination. An attempt to express this factor as an addition to transportation rates was not successful owing to disagreement among sources as to the amount of shrinkage which occurred. As far as livestock shipped East are concerned, these are generally bought on F.O.B. Western basis. Therefore, the Eastern buyer will try to pay fewer cents per 100 pounds according to his estimates of what tissue shrink will be. Some packing industry representatives estimate tissue shrink at 4 percent. In other words, a 1,000 pound animal shipped East for slaughter is expected to weigh 960 pounds when off-loaded at final destination. This represents a loss of potentially saleable meat. The shrinkage on beef is only about one pound a day per carcase.[1] This is a major reason why the shipment of beef from the Prairies to Eastern Canadian markets has been increasingly preferred to the shipment of livestock over the last decade. Improvements in meat transportation technology have also facilitated meat shipments. It seems likely, however, that the shipments East of livestock for slaughter will continue, if plants located at consumption markets cannot procure enough volume, since they are under pressure to make some use of slaughter facilities to cover at least some operational costs.[2]

There are several factors which complicate shrinkage calculations on slaughter cattle:

1. There was some evidence to suggest from interviews, that individual firms might vary their shrinkage in accordance with their

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[1] Meat Packer estimate, Alberta, 1972.

[2] Confidential Industry information, Alberta, 1972.

profit position--a sort of "cost-umbrella." Estimates included 3, 4, 5, and 6 percent.[1]

2. The amount of livestock shrink between origin and destination is affected by the length of time between weighing and when the cattle were last fed; the longer the time period, the less shrink will occur.[2]

3. It is illegal to ship livestock for more than 36 hours without a stop for rest, water and feed, but, whereas one railway company includes time taken to load and unload in the 36 hours, the other company does not. Both stop at Winnipeg, but one also schedules another stop at White River in Ontario. It would appear from recent research, however, in particular with reference to feeder cattle shipped East, that the sooner they are unloaded at final destination, the less strain they undergo. It has been sugtested to the railways that feeder shrinkage may be as much as 9 to 10 percent.

It is possible that the mandatory stops for livestock trains may be eliminated in future. An experiment is being conducted by Canadian Pacific Railways and an independent Saskatchewan cattleman. A modified CP Rail double-deck livestock car has been equipped with an

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[1] In practice, however, some slaughter cattle shipped East may be fed by the meat packers for two days on a high energy diet, eliminating most of the shrinkage. The costs of the feeding are compensated for by the reduction in shrinkage. Information from Dr. M. H. Hawkins, University of Alberta, Department of Agricultural Economics and Rural Sociology, June, 1972.

[2] G. F. Henning and P. R. Thomas, Some of the Factors Influencing the Shrinkage of Livestock from the Farms to the First Market, Research Bulletin 925 (Wooster, Ohio: Ohio Agricultural Experiment Station, October, 1962), p. 3.

automatic feeding and watering system for feeding cattle in transit. The third and best of the three trial runs (the total weight of the cattle was approximately 48,000 lbs.) from Swift Current, Saskatchewan, to Toronto in May, 1972, took 63 hours compared with the normal time of five days. The cattle lost 6.1 percent of their body weight. On the first trial (72 hours) the recorded shrinkage was 8.8 percent. CP Rail is studying the economic potential of a large scale conversion of stock cars. At present CP Rail has 50 double deck cars equipped by the railway and 150 cars in Calgary equipped by shippers.

4. It is difficult to establish the number of cattle loaded in a car, since this depends on their size and weight, the number of decks, and size of the car. The railways have recommended safe loading levels but these are regularly exceeded. In practice, the stock cars probably carry about 750 pounds per foot. Public stockyard officials suggested 31-58 animals would be loaded in each car, depending on the size of the animals and the number of decks.

Dressed beef is usually bought on a delivered basis and the shrinkage tends to be based on industry experience. The current negotiated beef carcase shrink percentages are shown in Table 3.11. With beef the seller must bear freight and shrinkage, so prices are set to cover this cost.

TABLE 3.11

NEGOTIATED SHRINKAGE ALLOWANCE ON BEEF CARCASE SHIPMENTS TO MONTREAL BEEF WHOLESALERS

Supplier	Shrink (percentage)
Alberta	0.65
Saskatchewan	0.60
Manitoba	0.50
Ontario	0.25

Source: M. H. Hawkins and T. W. Manning, A Study of the Montreal Wholesale Beef Trade, Research Bulletin 7 (Edmonton: University of Alberta, Department of Agricultural Economics and Rural Sociology, March, 1970), p. 4.

Destination of Shipments from Alberta Beef Packing Plants

Data on the interprovincial movement of goods have been in demand because of their relevance to investigations into regional disparities in economic development and into fluctuations in the level of business expansion by province. Such data may also provide necessary information for those concerned with the establishment and location of new or expanding industries. It is of interest to discover whither the packing plants located in Alberta ship their goods of own manufacture, and if the destination of shipments varies with plant location within Alberta. Table 3.12 shows the flow of goods from Alberta to the rest of Canada on an aggregate basis for 1967.[1] Alberta's slaughtering and meat

[1] Statistics Canada, Destination of Shipments of Manufacturers, Cat. No. 31-504 (Ottawa: Queen's Printer, July, 1971), pp. 122-123, 146-147.

TABLE 3.12

DESTINATION OF TOTAL SHIPMENTS OF GOODS OF OWN MANUFACTURE BY THE FOOD AND BEVERAGE INDUSTRIES AND THE MEAT PACKING INDUSTRY IN ALBERTA, 1967

Industry Group and Industry	Destination of Shipments											
	Newfound-land	Prince Edward Island	Nova Scotia	New Bruns-wick	Quebec	Ontario	Manitoba	Saskat-chewan	Alberta	British Columbia	Yukon and Northwest Territories	Other Countries	Total
	(thousands of dollars)												
Total	1,817	513	1,122	2,186	114,128	79,292	45,584	97,625	883,716	158,732	12,953	129,328	1,526,991
Food and Beverage Industries	X[a]	280	X	X	93,047	31,431	12,112	23,510	341,164	90,703	3,696	36,107	635,347
Slaughtering and Meat Processors	1,309	280	X	1,431	87,452	26,735	4,385	15,075	128,233	67,163	X	14,352	349,980

[a] Confidential

Source: Statistics Canada, Destination of Shipments of Manufacturers, Cat. No. 31-504 (Ottawa: Queen's Printer, July, 1971), pp. 122-123.

processing industry accounted for $349,980,000 worth of shipments, which was 22.91 percent of the total shipments from the province. The industry accounted for 76.62 percent or $87,452,000 of the total shipments to Quebec and 33.71 percent or $26,735,000 of the total shipments to Ontario. It was also responsible for 42.31 percent or $67,163,000 of the total shipments to British Columbia. Of the total shipments by the Alberta food and beverage industries, the slaughtering and meat processors had a 55.08 percentage share in 1967.

Table 3.13 compares the interprovincial flow of the packing industry's products from the three Prairie Provinces in 1967. Of the total Alberta shipments of $117,207,000 to Quebec, Ontario and the Atlantic Provinces (Eastern Canada), 74.61 percent went to Quebec, 22.81 percent to Ontario and 2.57 percent to the Atlantic Provinces. British Columbia received 36.42 percent of the Alberta shipments to the meat deficit regions. For the Manitoba meat packing industry, the corresponding figures were 26.21 percent to Quebec, 65.09 percent to Ontario, 8.69 percent to the Atlantic Provinces and 0.32 percent to British Columbia. Saskatchewan meat packers sent 55.42 percent to Quebec, 18.85 percent to Ontario, 25.71 percent to the Atlantic Provinces and 7.48 percent to British Columbia.

There are, as yet, no official figures for the destination of shipments from Alberta in 1971, but Table 3.14 supplements Tables 3.12 and 3.13. In 1970, the railways carried meat products in directions similar to the destinations indicated for 1967. The largest consignment of fresh meat was shipped from Alberta and the largest shipment of meat unloaded was in Quebec. Table 3.14 also suggests that the meat packers

TABLE 3.13

DESTINATION OF TOTAL SHIPMENTS OF GOODS OF OWN MANUFACTURE BY SLAUGHTERING AND MEAT PROCESSORS IN THE PRAIRIE PROVINCES, 1967

Province of Origin	Destination of Shipments												
	Newfound-land	Prince Edward Island	Nova Scotia	New Bruns-wick	Quebec	Ontario	Manitoba	Saskat-chewan	Alberta	British Columbia	Yukon and Northwest Territories	Other Countries	Total
	(thousands of dollars)												
Manitoba	1,501	--[a]	4,176	2,120	23,784	59,070	72,393	1,745	887	292	--	6,814	172,972
Saskatchewan	X[b]	X	4,342	2,356	14,438	4,912	5,441	45,637	3,119	2,106	--	1,391	83,984
Alberta	1,309	280	X	1,431	87,452	26,735	4,385	15,075	128,233	67,163	X	14,352	349,980

[a] Nil or zero.

[b] Confidential

Source: Statistics Canada, Destination of Shipments of Manufacturers, Cat No. 31-504 (Ottawa: Queen's Printer, July, 1971), pp. 146-147.

TABLE 3.14

CATTLE AND MEAT PRODUCTS LOADED AND UNLOADED BY RAILWAYS WITHIN EACH PROVINCE, 1970

Province	Cattle			Meat Fresh or Chilled			Meat Frozen			Meat Preparations (N.E.S.)[a]		
	Loaded		Unloaded	Loaded		Unloaded	Loaded		Unloaded	Loaded		Unloaded
	(cars)	(tons)	(tons)	(cars)	(tons)	(tons)	(cars)	(tons)	(tons)	(cars)	(tons)	(tons)
Newfoundland	--[b]	--	1,295	11	243	5,142	4	74	6,533	4	85	2,183
Prince Edward Island	141	1,386	164	28	321	589	--	--	245	54	685	--
Nova Scotia	281	2,705	97	56	1,372	6,216	29	601	1,573	39	740	2,476
New Brunswick	142	1,448	2,245	31	648	11,733	234	7,108	3,131	44	1,068	1,228
Quebec	126	1,396	7,831	40	775	128,954	645	16,956	8,179	245	5,132	2,400
Ontario	739	9,146	108,376	616	14,072	27,391	294	5,920	17,464	146	3,182	6,024
Manitoba	1,885	30,085	8,009	4,266	71,515	404	84	2,189	1,497	48	768	929
Saskatchewan	3,410	47,014	3,010	1,072	15,832	485	79	2,289	1,495	8	217	458
Alberta	3,547	58,248	2,092	5,285	10,254	213	174	4,875	3,643	119	2,986	1,291
British Columbia	310	3,998	8,526[c]	4	29	4,267	64	2,887	1,712	141	5,091	834

[a] N.E.S.--not elsewhere specified.

[b] Nil or zero.

[c] Since 1970, many smaller packing plants in British Columbia have been closed. Dressed beef now moves from Alberta to British Columbia.

Source: Statistics Canada, Railway Freight Traffic, Cat. No. 52-002 (Ottawa: Queen's Printer, 1970).

in Manitoba and Saskatchewan are still shipping sizeable quantities of fresh meat products. This table also corroborates the information in Table A.3.2 which indicated that the largest numbers of cattle are shipped to Ontario.

Estimates from the beef packing industry suggest that the trade flow patterns of its products have changed little. The national packers in Edmonton estimated that they shipped between 40 and 67 percent of their slaughter to Eastern Canada, particularly to Montreal. From Calgary the total was between 20 and 67 percent, depending on the firm. Plants at Lethbridge tended to ship nearly all beef output either to Eastern Canada or to British Columbia. In each case, after the shipments to the East, the balance of output went mostly to British Columbia or was for the Alberta market. From any individual plant the amount exported from Canada was surprisingly small. The leading national packer tended, in most cases, to ship a greater percentage of plant output to Eastern Canada or British Columbia than did any of its competitors. Only in one case was almost all output shipped to British Columbia. The independent packing firms are tending to supply the Alberta home market, both in the urban areas and in the rural districts, where the greater proportion of business is custom slaughter.

The beef packing industry, therefore, in Alberta in particular, but also in Manitoba and Saskatchewan, is essentially export oriented. Although there has been considerable discussion and disagreement as to the exact influence of the transportation system on the location of the meat packing industry as a whole, it seems that transportation costs of Prairie economic activity must form a substantial part of cost

of production and must, as such, become part of the necessary price of final goods. On meat products, for example, which are shipped East and paid for on a delivered basis, the seller bears the cost of damage and shrinkage. The price share of the transport "factor" of production depends on the value of the goods, their supply and demand characteristics, and the distance shipped.[1] Alberta has the greatest disadvantage of the three Prairie Provinces, by reason of her Western position, with respect to goods shipped to Eastern Canada. On the other hand, this disadvantage is balanced by her relative locational advantage in servicing the needs of British Columbia.

Conclusions

The data presented on slaughter cattle output, the numbers of beef cattle on farms, and total marketings provide evidence that Alberta does have a competitive advantage as a location for beef slaughtering and packing plants, in comparison with the supply situation in other provinces. The data on feeder cattle show that the greatest numbers of feeders are being purchased for finishing in Alberta, which suggests that this province will retain the lead in beef cattle supply in future.

The current negotiated freight rates on cattle and beef products and the discounting of shrinkage costs on livestock in transit facilitate the shipment of beef from Alberta to Eastern Canada. Alberta can also supply most of the beef shipped to British Columbia.

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[1] Wilson and Darby, _op. cit._, p. 5.

The high quality meat demanded by consumers can be supplied by this province which has a consistent record of high grade beef production. In 1971, beef carcases graded choice and good in federally inspected packing plants represented nearly 75 percent of Alberta's beef production. Increasing flexibility of transfer services can only have a favourable effect on freedom of choice with respect to packing plant locations.

CHAPTER IV

THE CURRENT SITUATION IN ALBERTA WITH RESPECT TO THE BEEF PACKING INDUSTRY

The objective of this chapter is to consider the present situation of the Alberta beef packing industry in relation to the hypothesis stated in Chapter I: that the changing location of beef cattle production is the major factor which has influenced the location of packing plants. An examination of the spatial distribution of available slaughter supplies within Alberta, in relation to the present location of packing plant facilities, is included. It is expected that the relative success or failure of the industry's effort to match its capacity with the available supply of slaughter cattle may be reflected in plant costs of operation. Federal Government regional policy, as conceived in the programme of the Department of Regional Economic Expansion, is discussed insofar as it relates to the choice of plant sites by the meat packers. The capital and labour subsidies paid by the programme may affect the advantages of different locations for plants and the amount of consideration given to other costs, such as labour, fuel, electricity, water, sewage facilities, transportation, and other site costs.

Some of the information in this chapter has been gathered from various confidential sources.[1] An attempt to discover alternative sources of supplies including terminal markets, country auctions, assembly points and feedlots, contract and custom feeding, was to determine the necessary geographical extension of an individual plant's procurement network to obtain adequate slaughter cattle volume over prolonged periods of time.

The question of procurement and throughput is directly linked to the utilisation of plant kill capacity. Butz and Baker have pointed out that one of the keys to success in the packing industry is a large volume of turnover to spread fixed costs over a large output, thus reducing costs per unit.[2] Attempts were made to estimate capacity utilisation rates using maximum potential kill capacity in relation to actual utilisation levels. Unfortunately, the data obtained were incomplete owing to the extreme reluctance of the packing industry to release the necessary information. This study has been forced to rely on verbal estimates from within the industry to supplement and to update the figures and projections made by previous studies.[3]

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[1] By interview and a questionnaire. Information was requested on the composition and location of supplies, destination of shipments and sales, utilisation of capacity and various costs of operation. Few replies to the questionnaire were received.

[2] Butz and Baker, op. cit., p. 37.

[3] Nicholson, op. cit., p. 90; Carlson, op. cit., p. 178; Management Research Associates, op. cit., p. 214.

Slaughter Plant Location in Relation to Livestock Distribution

Table 4.1 shows the major slaughtering and processing plants operating in Alberta at the present time. To appraise these locations in relation to available provincial slaughter supply and its distribution, data on cattle numbers on farms, feeder cattle numbers, and cattle marketings, compiled by census division, were used.

Cattle Numbers on Alberta Farms

Cattle populations have tended to be largest in Central Alberta, in CD 7, CD 8 and CD 6. In the south, CD 3 also has a large number of cattle (Table 4.2). Figure 4.1 shows the distribution of cattle numbers in 1971. Beef breeding herds would appear to be concentrated in CD 7 (152,000 beef cows), CD 3 (148,000 beef cows), CD 6 (120,000 beef cows) and CD 8 (120,000 beef cows) (see Table 4.2). The central divisions also had the largest calf populations in 1971. In addition, it appears that the northern divisions have been increasing their beef herds for some time. Figure 4.2 shows past rates of increase in the total cattle populations in each census division. If the statistics above are used, beef packing plants might be expected to continue to locate in central Alberta. Table 4.1, however, indicates that this has not been the case.

The Location of Feeder Cattle

The drift of the packing plants to the south of the province can be explained in part by the fact that the largest number of feeder cattle sold off public stockyards now seem to be destined for the southern region where there are large commercial feedlots (Table 4.3). This suggests that greater numbers of finished cattle are potentially available as slaughter supply for the packing plants in this area.

TABLE 4.1

SLAUGHTERING AND PROCESSING PLANTS CURRENTLY OPERATING IN ALBERTA, 1972[a]

Edmonton[b]	Red Deer	Calgary	Lethbridge	Medicine Hat
Burns Foods Ltd.	Canada Packers[c]	Burns Foods Ltd.	Canada Packers Ltd.[c]	Alberta Western Beef Co. Ltd.[c]
Canada Packers Ltd.	Intercontinental Packers Ltd. (Red Deer Packers)	Canada Packers Ltd. (Calgary Packers)	Burns Foods Ltd.[c] (Canadian Dressed Meats)	Canada Packers Ltd.
Gainers Ltd.		Dvorkin Meat Packers Ltd.		
Swift Canadian Co. Ltd.		Rocky Mountain Packers	Swift Canadian Co. Ltd.[c]	

[a] These are the larger plants in Alberta in 1972. Numerous smaller, independent slaughter plants and packers, only some of which are federally inspected, also operate in the province, many of them on a custom slaughter basis. As at 1969, these included Brooks Meat Packing Ltd.; Capital Packers Ltd., Edmonton; Central Alberta Meat Co. Ltd., Edmonton; City Packers Ltd., Lethbridge; City Abbatoir (Calgary) Ltd.; Fort Macleod Abbatoir; Chester D. Gainer, Edmonton; Treen Meat Company, Medicine Hat; Grande Prairie Packers, Ltd. This incomplete list was difficult to update owing to the delay in the publication of the 1971 census returns. For new plants under construction or consideration, see Table 1.3 and Table 4.11, p. 8 and p. 96 of this study.

[b] The plants located in Edmonton are the older, multi-species, integrated plants. Recently, however, one national packer has installed a modernised block-ready beef line and another is expanding plant facilities.

[c] These are the newer, specialised plants, which slaughter beef only.

Source: Compiled from Statistics Canada, Annual Census of Manufacturers, Slaughtering and Meat Processors, Cat. No. 32-221 (Ottawa: Queen's Printer, 1966); also from verbal enquiries.

TABLE 4.2

ESTIMATED NUMBER AND TYPE OF CATTLE ON FARMS IN ALBERTA BY CENSUS DIVISION, (JUNE 1) 1969-1971

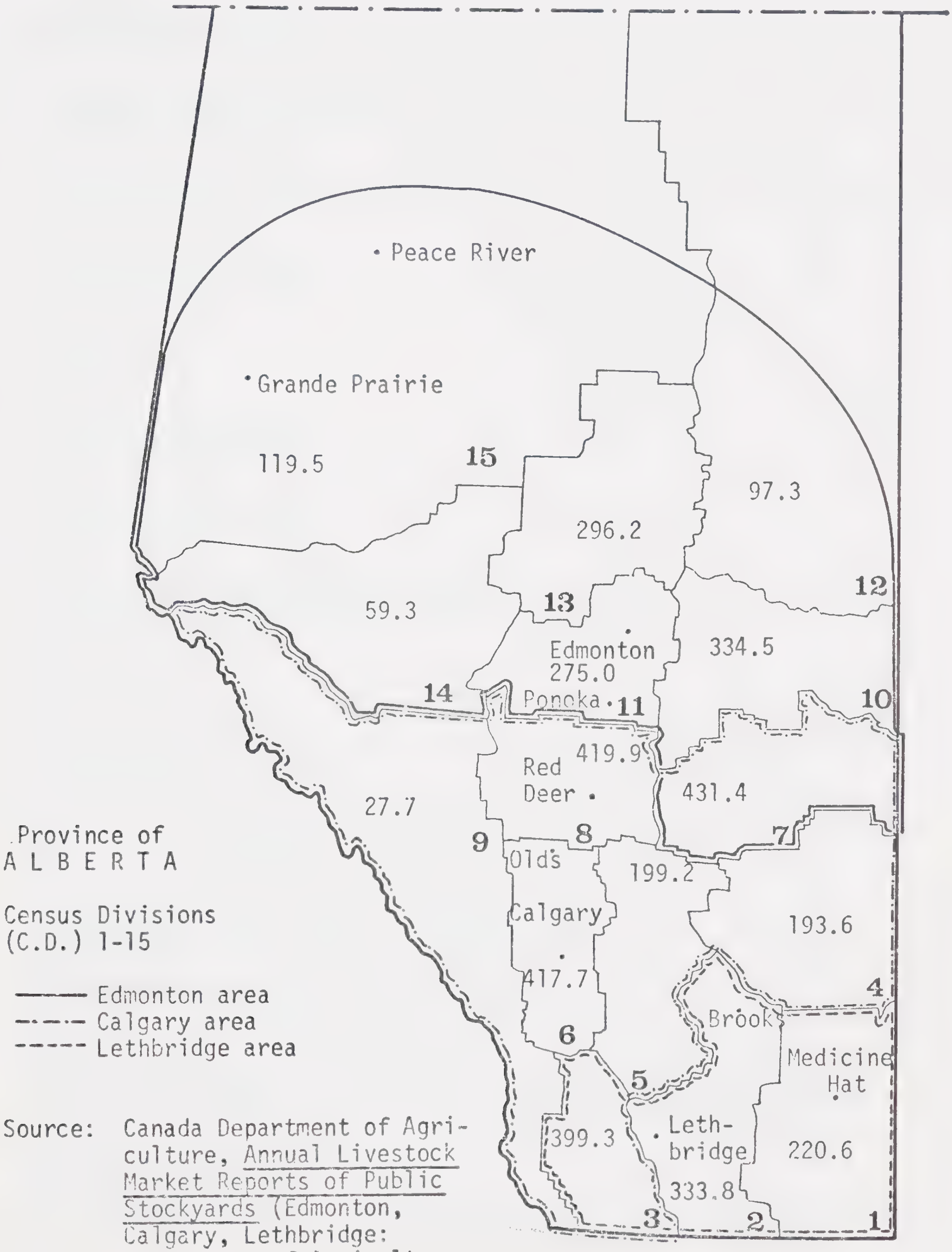
Census Division	Bulls			Beef Cows			Beef Heifers			Steers			Calves			Total Cattle and Calves[a]		
	1969	1970	1971	1969	1970	1971	1969	1970	1971	1969	1970	1971	1969	1970	1971	1969	1970	1971
C.D. 1	4.1	4.2	4.4	83.0	86.0	91.0	17.5	20.0	26.0	29.5	30.0	21.0	71.0	76.0	73.0	210.7	221.9	220.6
C.D. 2	5.8	5.0	6.3	106.0	103.0	98.0	44.5	52.0	53.0	58.0	59.0	68.5	88.5	90.0	92.0	318.7	323.3	333.8
C.D. 3	5.9	5.4	7.4	122.0	127.0	148.0	39.0	38.0	39.0	56.0	58.0	61.0	95.0	105.0	138.0	323.2	339.2	399.3
C.D. 4	3.3	3.3	5.3	75.0	73.0	75.0	22.5	26.0	23.0	15.5	17.0	19.0	63.0	67.0	70.0	180.9	187.8	193.6
C.D. 5	3.0	2.9	3.4	63.0	65.0	74.0	24.5	20.0	22.0	22.0	24.0	25.0	56.5	60.0	70.0	173.3	175.5	199.2
C.D. 6	6.1	6.8	8.2	99.5	115.0	120.0	48.5	53.0	45.0	96.5	92.0	120.0	88.5	114.0	106.0	356.9	397.6	417.7
C.D. 7	6.9	6.5	7.9	135.5	141.0	152.0	44.5	44.5	53.0	46.0	46.0	43.0	120.0	135.0	157.0	369.1	392.0	431.4
C.D. 8	5.7	5.5	6.3	100.0	113.0	120.0	35.5	36.0	39.0	82.5	80.0	86.0	111.0	125.0	140.0	363.2	386.5	419.9
C.D. 9	0.6	0.6	0.7	9.5	8.5	9.0	1.5	2.0	4.0	1.5	2.0	3.0	7.5	7.5	10.0	21.1	21.3	27.7
C.D. 10	6.1	5.7	6.0	90.0	92.0	102.0	32.5	28.0	32.0	44.0	52.0	70.0	93.0	93.0	92.0	301.7	302.9	334.5
C.D. 11	4.0	3.6	4.0	51.0	52.0	68.0	19.5	20.0	17.0	43.5	47.0	42.0	71.0	77.0	85.0	245.5	257.1	275.0
C.D. 12	1.8	2.2	2.3	31.0	32.0	35.0	7.8	7.7	11.0	3.9	5.0	5.5	31.0	33.0	33.0	87.2	91.1	97.3
C.D. 13	4.2	5.0	5.4	75.5	83.0	90.0	30.6	30.0	33.0	30.8	32.0	39.0	84.5	85.0	101.0	252.7	263.6	296.2
C.D. 14	1.2	1.5	1.7	21.5	21.5	21.0	5.6	.	6.0	3.3	3.0	5.0	21.5	22.0	20.0	58.5	58.1	59.3
C.D. 15	2.3	2.8	3.7	43.0	43.0	47.0	15.0	13.3	17.0	12.0	13.0	12.0	38.0	38.5	33.0	117.3	117.1	119.5
Province	61.0	61.0	73.0	1,105,9	1,155.0	1,250.0	389.0	395.0	420.0	545.0	560.0	620.0	1,040.0	1,128.0	1,220.0	3,380.0	3,535.0	3,825.0

[a] Includes dairy cows and dairy heifers.

Source: Alberta Department of Agriculture, Agricultural Statistics (Edmonton: Alberta Department of Agriculture, Economics Division in cooperation with Statistics Canada, September 14, 1970 andAugust 20, 1971).

FIGURE 4.1

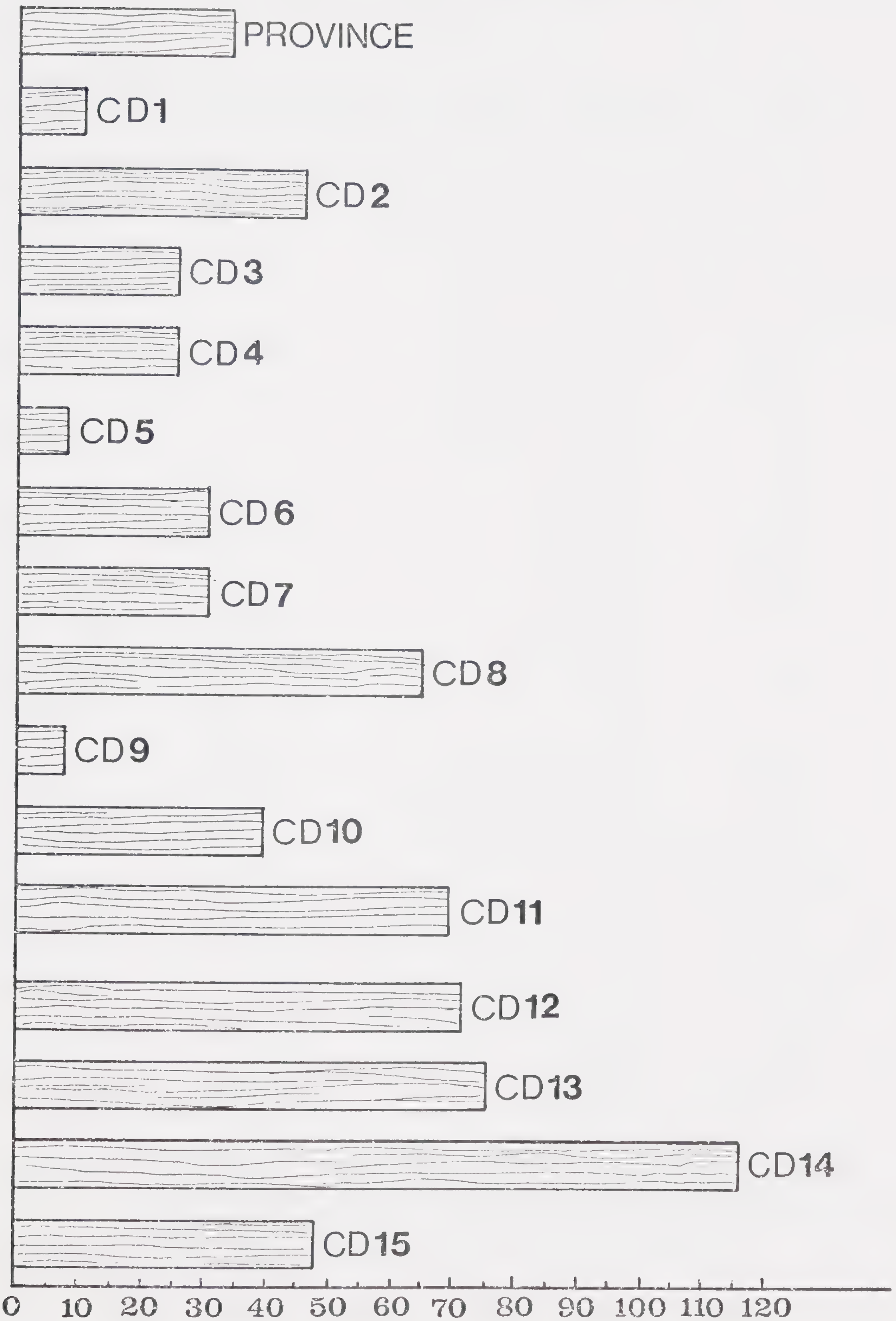
TOTAL CATTLE NUMBERS ('000 HEAD) IN EACH CENSUS DIVISION IN ALBERTA, 1971, AND THE SUPPLY AREA FOR EACH PUBLIC STOCKYARD



Source: Canada Department of Agriculture, Annual Livestock Market Reports of Public Stockyards (Edmonton, Calgary, Lethbridge: Department of Agriculture, 1971).

FIGURE 4.2

PERCENTAGE INCREASE IN TOTAL CATTLE POPULATIONS BY CENSUS DIVISION, 1956-1966



Source: Alberta Department of Agriculture, A Historical Series of Agricultural Statistics for Alberta, Publication No. 850 (Edmonton: Alberta Department of Agriculture, Statistics Branch, 1966). Alberta Department of Agriculture, Agricultural Statistics (Edmonton: Alberta Department of Agriculture in cooperation with Statistics Canada, 1961-1966).

TABLE 4.3

DESTINATION OF FEEDERS (CATTLE) FROM CALGARY, EDMONTON AND LETHBRIDGE PUBLIC STOCKYARDS, 1968-1971

Census Division	1968	1969	1970	1971
C.D. 1	776	719	1,009	732
C.D. 2	38,642	52,145	46,235	54,242
C.D. 3	18,134	6,895	6,661	9,281
C.D. 4	13,439	272	348	327
C.D. 5	69,536	15,555	11,910	13,159
C.D. 6	166,563	32,854	29,042	33,064
C.D. 7	25,078	12,593	13,750	18,537
C.D. 8	85,253	28,623	23,890	24,383
C.D. 9	141	--	--	--
C.D. 10	16,547	19,737	18,019	19,115
C.D. 11	32,170	28,269	24,536	23,848
C.D. 12	2,715	2,901	2,732	2,765
C.D. 13	10,871	11,964	13,959	11,381
C.D. 14	935	1,014	822	1,099
C.D. 15	1,111	672	514	818
Province	481,910	214,253	193,427	212,751

Source: Calculated from Canada Department of Agriculture, Livestock Market Reports of Calgary, Edmonton and Lethbridge Public Stockyards (Calgary, Edmonton and Lethbridge: Canada Department of Agriculture, 1968-1971).

Additional data on the numbers of cattle on feed by region and feeder cattle marketings by province are shown in Tables C.4.1 and A.3.9.[1] It seems that the Edmonton public stockyards now handle more feeder cattle than the Calgary stockyards and that the feeders are being moved south for finishing. The Calgary market deals predominantly with finished, fat cattle and more animals were marketed at Calgary than at Edmonton in 1971. Table 4.4 shows Alberta cattle marketings by census divisions. CD 2 and CD 6 have consistently had the largest annual marketings. Figure 4.1 indicates the public stockyards at which each division tends to market its cattle. (See also Table C.4.2.) CD 3 markets cattle at Lethbridge but sends more to Calgary. CD 7, which has the largest calf population (150,000 head in 1971), uses both Calgary and Edmonton. More cattle tend to be sent to Edmonton as feeders.

Cattle Marketings in Alberta

The use of statistics on cattle marketings to appraise beef packing plant locations can be misleading partly because of the fact that the public stockyards, which have the most reliable records, are now handling a diminishing proportion of provincial cattle marketings. The records from country auctions are incomplete. An explanation for the reduction in the numbers of cattle marketed through the public stockyards can be found in the increasing number of animals sold directly off farms and feedlots to packing plants. Table 4.5A shows the proportion of the total marketings by census division delivered direct to packing plants as compared with the number of cattle sent to stockyards.

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[1] Tables preceded by "C" are included in Appendix C.

TABLE 4.4

ALBERTA CATTLE MARKETINGS BY CENSUS DIVISION, 1966-1971

Year	CD1	CD2	CD3	CD4	CD5	CD6	CD7	CD8	CD9	CD10	CD11	CD12	CD13	CD14	CD15
								(number of head)							
1966	33,072	155,045	71,946	21,002	79,567	195,868	98,196	142,103	192	123,165	138,239	31,321	70,987	5,458	40,996
1967	37,023	165,501	71,806	22,130	87,189	187,074	81,445	141,192	142	109,101	132,090	30,994	70,295	6,158	34,291
1968	47,569	197,004	78,280	19,010	94,501	219,208	86,026	151,372	142	119,319	140,888	34,615	74,289	6,788	28,815
1969	41,162	205,552	81,501	17,448	100,910	200,146	78,239	138,797	72	115,647	122,559	27,746	73,603	5,113	31,579
1970	36,999	207,423	80,315	16,133	95,037	187,713	70,130	133,049	10	121,380	115,278	26,246	65,410	3,848	23,021
1971	41,828	241,033	83,076	17,096	92,374	189,815	75,350	135,339	4	118,871	112,651	27,994	67,511	4,752	21,783

Source: Canada Department of Agriculture, Annual Livestock Market Review (Ottawa: Queen's Printer, 1966-1971).

TABLE 4.5A

ALBERTA CATTLE MARKETINGS SHOWING PERCENTAGE OF TOTAL NUMBER SOLD IN EACH CENSUS DIVISION SHIPPED DIRECT TO PACKING PLANTS, 1969-1971

	Public Stockyards			Grand Total[a]			Direct to Packing Plants			Direct to Plants as Percentage of Total		
	1969	1970	1971	1969	1970	1971	1969	1970	1971	1969	1970	1971
	(number of head)											
CD1	2,729	1,368	1,728	41,162	36,999	41,828	36,907	34,204	39,482	89.66	92.44	94.39
CD2	27,614	26,473	20,311	205,552	207,423	241,033	174,580	179,260	220,122	84.93	86.42	91.32
CD3	18,433	17,295	15,431	81,501	80,315	83,076	60,864	61,683	66,650	74.67	76.80	80.22
CD4	11,390	9,635	11,317	17,448	16,133	17,096	5,846	5,696	5,635	33.50	35.30	32.96
CD5	67,139	58,639	55,176	100,910	95,037	92,374	33,715	36,356	37,148	33.41	38.25	40.21
CD6	150,809	128,177	118,183	200,146	187,713	189,815	48,700	58,826	71,172	24.33	31.33	37.49
CD7	31,561	24,942	27,399	78,239	70,130	75,350	46,422	44,723	47,364	59.33	63.77	62.85
CD8	28,185	16,998	17,030	138,797	133,049	135,339	109,315	115,197	117,656	78.75	86.58	86.93
CD9	72	10	4	72	10	4	-	-	-	-	-	-
CD10	54,720	50,043	49,551	115,647	121,380	118,871	60,665	71,125	69,178	52.45	58.59	58.19
CD11	58,601	52,222	54,123	122,559	115,278	112,651	63,849	62,958	58,481	52.09	54.61	51.91
CD12	22,386	20,880	21,235	27,746	26,246	27,994	5,328	5,366	6,759	19.20	20.44	24.14
CD13	48,453	42,698	48,267	73,603	65,410	67,511	25,097	22,487	19,087	34.09	34.37	28.27
CD14	4,931	3,742	4,595	5,113	3,848	1,099	182	47	145	3.55	1.22	13.19
CD15	18,971	13,143	11,866	31,579	23,021	21,783	12,608	9,877	9,917	39.92	42.90	45.52

[a] Includes livestock shipped direct on export and to country points in other provinces.

Source: Canada Department of Agriculture, Annual Livestock Market Review (Ottawa: Queen's Printer, 1969-71).

Table 4.5B gives the same information for Alberta as a whole. For example direct-to-packing-plant deliveries in CD 2 represented 84.93 percent of the division's total marketings in 1969 and 91.32 percent in 1971. The declining role of the public yards is apparent in some divisions despite the general increase in the total provincial cattle marketings after the decline from 1968 to 1970 (Table 3.5).

The data presented suggests that the apparent availability of additional slaughter volume from the country and from feedlots may have been an important factor in the development of Lethbridge as a slaughter centre over the last few years. One of the national packers has built a new specialised beef slaughter plant in Lethbridge which has been in operation for one year. The company previously closed an integrated and more obsolete plant in Calgary. The other national packers have also expanded and modernised their Lethbridge facilities. The proximity of the city to the United States border and the possibility of access to other slaughter volume and markets, or the possibility of supplying cattle and beef products, may be another factor favouring the city's development as a beef packing and slaughter centre.

Plant Procurement Policy: Source and Composition

One of the packers' concerns is to obtain a continuous, adequate volume of throughput. When the larger packers were interviewed, there was no evidence that any consignment of slaughter input was ever refused. There seemed to be a general tendency to take supplies from wherever they were available. Table 4.6 shows the sources of packing plant procurement as far as such information was given. Respondents stated

TABLE 4.5B

PROPORTION OF TOTAL ALBERTA CATTLE MARKETINGS SHIPPED DIRECT TO PACKING PLANTS, 1960-1971

Year	Public Stockyards	Direct to Packing Plants	Total Marketings[a]	Direct to Plant Shipments as Percentage of Total
	(number of head)			
1960	486,000	292,062	825,754	35.36
1961	479,979	350,582	882,344	39.73
1962	487,960	330,208	875,932	37.69
1963	458,089	382,346	864,648	44.21
1964	502,754	449,554	967,878	46.44
1965	608,357	530,892	1,163,237	45.63
1966	629,634	560,852	1,207,157	46.46
1967	557,854	610,954	1,182,431	51.66
1968	595,993	686,343	1,297,826	52.88
1969	545,994	684,078	1,240,074	55.16
1970	466,265	707,805	1,181,992	59.88
1971	456,216	768,796	1,229,477	62.53

[a] Includes cattle shipped direct on export and to country points in other provinces.

Source: Canada Department of Agriculture, Annual Livestock Market Review (Ottawa: Queen's Printer, 1962, 1966, 1971).

TABLE 4.6

SOME INDUSTRY ESTIMATES OF PROPORTIONS OF CATTLE OBTAINED FROM DIFFERENT SOURCES, 1972

	Public Stockyards	Country Auctions	Farm Feedlots	Commercial Feedlots
Edmonton				
Plant A	25%	-------------- 75% ----------------		
Plant B	30-35%	33%	-------- 33% ----------	
Plant C	30-40%	------------- 60-70% ---------------		
Plant D	n.a.[a]	n.a.	n.a.	n.a.
Calgary				
Plant A	20%	-------------- 80% ----------------		
Plant B	30%	nil	30%	40%
Plant C	n.a.	n.a.	n.a.	n.a.
Plant D	90%	nil	5%	5%
Lethbridge[b]				
Plant A	5%	-------------- 95% ----------------		
Plant B	n.a.	n.a.	n.a.	n.a.
Plant C	n.a.	n.a.	n.a.	n.a.
Medicine Hat				
Plant A	n.a.	n.a.	n.a.	n.a.
Plant B	n.a.	n.a.	n.a.	n.a.
Red Deer				
Plant A	15-20%	nil	------- 80-85% --------	
Plant B	10%	20%	------- 70% --------	
Brooks				
Plant A[c]	15%	nil	------- 85% --------	

[a] Not available.

[b] The proportions for other plants are probably similar since census division 2 markets most of its cattle via direct farm to plant deliveries. (See Table 4.5A, p. 80.)

[c] Projected.

Source: Industry information by interviews and correspondence, Alberta, 1972.

that country auctions were usually worth attending if at least 200 cattle were offered for sale. A possible supply area for an Edmonton plant is as follows:

Edmonton to Lloydminster	:	150 miles east
Edmonton to Red Deer	:	100 miles south
Edmonton to Edson and the Foothills	:	150 miles west
Edmonton to Northern Alberta	:	300+ miles north

Occasional loads of slaughter cattle may be moved over longer distances.

Even the smaller independent Edmonton packers may have a supply radius of at least 150 miles. A national packer uses a system of horizontal divisions across the province. Its Edmonton plant supply area extends south to Ponoka. The Red Deer procurement area is between Olds and Ponoka. The Calgary area includes Brooks and Olds, and Lethbridge takes up supplies from the remaining area. Reference to Figure 4.1 (page 75) illustrates the position of these points. This packing firm buys cattle in every census division. Considerable use is made by other packers of livestock commission agencies because of their knowledge of market conditions over the province and their access to about 30 percent of the slaughter cattle in Alberta. It was suggested that packers are always looking for more slaughter input. The evidence collected suggested that the relative importance of alternative sources of packing plant procurement varies with location. More cattle in the southern census divisions are obtained directly by deliveries from feedlots and country areas, while the terminal markets still provide

about a third of the supplies for plants in central Alberta.[1]

For the beef packers, the 1971 cattle prices remained higher than in previous years despite the increase in the number of animals marketed from 1970 (Table 4.4). The main reason for this price trend is that Canadian beef production does not seem to be keeping pace with rising consumer demand. Indeed Canada has been a net importer of beef products since 1969 (Tables A.3.5, A.3.6, and A.3.7). The level of cattle prices (Table 4.7) has meant high costs for the beef packers; these costs have been of concern to packers in Alberta. Most current industry estimates suggest an average provincial utilisation of maximum kill capacity of about 50-60 percent which is also alleged to be affecting plant costs.[2] The highest average monthly prices for slaughter cattle occur over the summer months, when cattle are scarce in the marketing channels, since they are out on pasture.

The outlook for 1972, as far as input supply costs are concerned, shows little change for the meat packing industry in Canada.[3] A possible decline in cattle prices, which may result in an improved

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[1] A similar conclusion was reached by M. H. Hawkins and R. R. Hurnanen, Beef Cattle Marketing Problems in Alberta, prepared for presentation at the 15th Annual CAES Workshop, Banff, Alberta (Edmonton: University of Alberta, Department of Agricultural Economics and Rural Sociology, June, 1971), pp. 12-13.

[2] Information from confidential interviews, Alberta, 1972. This may be an underestimate.

[3] Meat Packers' Council of Canada, Facts, Figures, Comment, Vol. 22 (Islington, Ontario: Meat Packers' Council of Canada, January to May 4, 1972), various issues. The Canadian market situation tends to move in sympathy with the livestock situation in the United States, where beef production is estimated to increase about 3-4 percent from 1971 levels. Fed cattle prices are expected to drop, but this may be offset by increases in population and consumer incomes.

TABLE 4.7

ANNUAL AVERAGE PRICES AND PRICE RANGE OF CHOICE STEERS AT PUBLIC STOCKYARDS, 1969-1971[a]

City	1969		1970		1971	
	Price	Range	Price	Range	Price	Range
			($ per 100 lbs.)			
Calgary	28.65	25.25 - 35.60	29.90	27.25 - 32.80	32.25	30.00 - 35.00
Edmonton	28.20	25.00 - 35.90	29.65	27.00 - 32.30	31.80	29.50 - 34.00
Lethbridge	28.55	25.00 - 35.85	29.78	26.75 - 32.40	32.25	29.50 - 34.80
Winnipeg	30.00	26.00 - 37.50	31.05	28.00 - 33.50	33.15	29.50 - 35.50
Toronto	31.10	27.50 - 37.50	32.25	29.00 - 34.00	34.30	30.50 - 38.00
Montreal[b]	32.05	27.00 - 39.10	32.55	28.75 - 35.00	34.12	32.00 - 37.00

[a] Choice steer prices are considered since the majority of the beef slaughtered in Alberta is graded choice or good. Comparisons, however, are difficult because the differences in prices at Edmonton and Calgary can be explained by the condition of the cattle. At Calgary the cattle tend to be finished, fat and empty. At Edmonton, the cattle tend to be feeders, and Edmonton prices may be higher at certain times of the year. The Lethbridge prices are a less reliable guide since the numbers of cattle marketed through this stockyard have declined more rapidly.

[b] Prices from two markets.

Source: Canada Department of Agriculture, Annual Livestock Market Review (Ottawa: Queen's Printer, 1969-1971).

overall position for the packers, is apparently viewed with relief, since for some time "The greatest problem of the meat packing division was beef operations."[1]

Procurement Costs

In an attempt to cover the transport costs of moving cattle supplies to the plant, the packer prefers to buy F.O.B. plant. His offer price depends on the estimated dressing out percentage and also on the estimated distance cattle must be moved to the plant. Most packer buyers are equipped with a "ready reckoner," which allows quick reference as to the price they should offer based on their judgement of dressed carcase weight. The dressed yield is affected by the amount of fill, the type and sex of animal, degree of finish and cleanliness of hide. The yield may affect live prices. For example:

TABLE 4.8

THE RELATIONSHIP BETWEEN DRESSED CARCASE YIELD AND PACKER PRICES FOR CATTLE

Dressed Beef Price per 100 lbs.	Yield and Live Value per 100 lbs. of Cattle Dressing			
	50%	54%	57%	60%
$40.00	$20.00	$21.00	$22.80	$24.00
50.00	25.00	27.00	28.50	30.00
60.00	30.00	32.40	34.20	36.00

Source: Meat Packers' Council of Canada, Canada's Meat Industry (Islington, Ontario: Meat Packers' Council, 1971), p. 12.

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[1] Burns Foods Ltd., Annual Report (Calgary: Burns Foods, 1970), p. 4.

One large packer situated close to the Edmonton terminal market estimated that the transport cost from stockyard to plant (F.O.B.) is 5 cents per hundred pounds live. Another independent packer who uses his own trucks estimated that each truck trip from the stockyard to the plant costs ten dollars. Each truck takes ten head of cattle, but it was explained that this estimated transport cost of one dollar a head also included labour and depreciation cost.[1] The cost of transporting cattle from country points to the plants varied from 25 to 75 cents per hundred pounds live, depending on the distance involved. Reference to the truck liner rates for cattle in Table 3.10(p.58) shows the costs involved for longer truck hauls. Table 4.9 gives the official truck rates on cattle for shorter hauls, but it is doubtful if these rates are adhered to since each trucking firm tends to have considerable flexibility in negotiating the rate schedules. It would appear that transport costs are a less important cost of procurement than was originally hypothesized since most of the commercial packers try to account for such costs in their offer prices for cattle.

The packers' costing procedure in relation to procurement outlays can be partially explained by reference to the methods of payment for direct shipments from supply points to packing plants and for cattle obtained through stockyards. Direct shipment of livestock is cheaper for packing plants and has provided farmers with higher returns.[2]

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[1] The difficulty of obtaining comparable sets of data from the packers who did cooperate with this study was a major problem. Both of these packer estimates of transport costs appear to be high.

[2] G. R. Winter, Conduct in Canadian Food Marketing, No. 2 (Ottawa: Agricultural Economics Research Council of Canada, 1969), p. 148. He used information from Canada Packers.

TABLE 4.9

LIVESTOCK (CATTLE) HAULING RATES BY TRUCK
WITHIN ALBERTA, 1971-1972

Distance		Rates: Cents Per 100 Pounds[a]
Over 5 miles, up to	10 miles	.16
10	15	.20
15	20	.24
20	25	.26
25	30	.29
30	35	.31
35	40	.33
40	45	.35
45	50	.37
50	55	.39
55	60	.41
60	65	.43

[a] Minimum weight for one load of cattle is 20,000 lbs. Minimum charge per load: up to 20 miles - \$25.00.
up to 30 miles - \$30.00.
\$1.00 per load mile between 30 and 100 miles.

Source: Transport Research and Development Branch, Alberta Department of Industry and Tourism (interview, Edmonton, April, 1972).

Stockyard charges in 1968-1969 were about 39 to 40 cents per 100 pounds to cover the costs of commissions, yardage and insurance.[1] Canada Packers stated in 1968-1969 that their buyers in the country were able to offer 27 cents more per 100 pounds to the farmer than the cattle would have fetched in the stockyards. At the same time, Canada Packers was making a saving of 12 cents per 100 pounds. Cattle delivered direct to plant cost 23 cents less per 100 pounds than the stockyard price for similar cattle and, allowing for stockyard charges of 38 cents, the farmer gained an extra 15 cents per 100 pounds by direct delivery.[2] Enquiries revealed that the charges at the public stockyards in 1972 are $1.90 a head for cattle over 500 pounds liveweight. Using an average weight of 900 pounds per animal, the stockyard charge is approximately 20 cents per 100 pounds. Despite this reduction in stockyard charges, the evidence in the annual reports suggests that direct to plant deliveries of slaughter cattle are still increasing.[3]

Utilisation of Capacity in Beef Packing Plants in Alberta

The results of previous studies and information obtained from persons closely connected with the beef packing industry in Alberta at the present time suggest that the industry is suffering from a problem of excess capacity.[4] Excess capacity is defined throughout this study

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[1] Ibid., p. 148.

[2] Ibid.

[3] Canada Department of Agriculture, Livestock Market Reporting Division (interview, Edmonton Public Stockyards, April, 1972).

[4] See notes 1 and 2, p. 9 of this study; Child, op. cit., pp. 6-7; also confidential industry sources, Alberta, 1972.

as under-utilisation of maximum potential kill capacity in a single shift, which may vary from 5 to 8 hours in length. The consideration of excess capacity in this study applies to the plants of the three national packers and to the plants of the larger, independent packers. The national packers probably control approximately 60-65 percent of Canada's slaughtering industry in terms of the numbers of livestock slaughtered.[1] Various verbal estimates from interviews suggested an average provincial capacity utilisation rate of between 50 and 60 percent. This may be pessimistic (Table 4.11, p. 96).

It is possible, however, that the capacity utilisation rate is higher in the single species plants of more recent construction at Lethbridge and Red Deer. Industry sources estimated that two plants are currently operating at about 80-90 percent of kill capacity. Older, integrated plants tend to operate at between 65 and 75 percent of kill capacity. Other industry representatives suggest that one of the national packers may have higher capacity utilisation rates because of the experience of its buyers in procuring cattle. For one plant, this packer uses over twice the number of cattle buyers[2] than does another national packer with a plant located in the same city. Lower utilisation rates generally tended to prevail at Edmonton because cattle feeding has been drifting to the south of the province (Table 4.3). Cattle

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[1] Special Joint Committee of the Senate and House of Commons, 1966, op. cit. Canada Packers estimated it accounted for about 28 percent of industry shipments at that time. The company's share may have increased slightly since that date. It is estimated from various sources that the other two national packers may account for about 30 percent of industry shipments.

[2] The size of this packing company's buying staff may inflate procurement costs.

sold in Edmonton at lighter weights are being shipped south for further feeding, so the packers are competing with feeding enterprises as well as with other slaughtering firms.

Methods Used to Match Plant Capacity with Slaughter Supplies

It would be inaccurate to suggest that the question of capacity utilisation is a new problem. It is an historical problem connected with seasonal variation in slaughter supply (Table 4.10). Achievement of a steady plant throughput necessitates adequate volume of supply. Canadian packers have preferred to have enough capacity to cope with peak supply periods but, for other months of the year, marketings are too small to use all plant facilities. The seasonal variation in each market in Table 4.10 is highly correlated and packer supply shortages may be exacerbated by the degree of competition among packer buyers for cattle. To some extent the independent negotiations of buyers in the "country" for direct farm or feedlot deliveries to plant has circumvented the problem of shortage of supplies, insofar as this is affected by stockyards and auctions functioning only on some days each week. One plant in a national packing firm prefers, if possible, to keep 10 to 20 percent of the week's throughput on hand on Monday morning, but supply shortages may often reduce this reserve to 3 percent.[1] The same plant also tries to even out throughput by varying the size and speed of the gangs on the slaughter floor--at the expense of full utilisation of available manpower. Integrated plants frequently vary their throughput of different species and some

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[1] Interview information, Alberta, 1972.

TABLE 4.10

MONTHLY CATTLE RECEIPTS AT PUBLIC STOCKYARDS IN ALBERTA, 1969-1971

Month	1969			1970			1971		
	Calgary	Edmonton	Lethbridge	Calgary	Edmonton	Lethbridge	Calgary	Edmonton	Lethbridge
					(number of head)				
January	19,635	12,964	1,613	18,610	14,681	2,499	14,286	2,091	12,512
February	20,101	15,279	2,405	14,930	13,543	2,464	12,211	1,960	14,980
March	28,336	24,202	3,551	20,916	19,786	2,890	19,034	2,671	19,338
April	21,868	20,026	3,046	17,625	21,736	2,396	16,512	3,043	18,443
May	17,583	19,080	2,060	16,005	16,936	1,595	14,793	1,864	18,673
June	26,790	26,559	3,300	20,634	20,702	2,514	20,584	1,953	22,568
July	19,142	18,358	2,121	21,736	17,174	2,401	20,953	1,996	16,391
August	19,237	19,465	2,294	20,120	18,118	2,039	20,899	1,247	18,041
September	29,622	27,644	2,719	26,993	20,322	3,854	25,729	1,907	26,005
October	27,645	20,394	2,782	22,259	16,558	3,018	20,719	2,025	20,571
November	26,693	19,668	3,655	18,815	18,348	4,266	20,193	3,170	18,679
December	21,519	19,204	4,086	11,076	11,695	2,355	13,315	1,438	12,754

Source: Canada Department of Agriculture, Annual Livestock Market Review (Ottawa: Queen's Printer, 1969-1971).

packers are also feeding cattle themselves. The number, however, is not large, since the investment in feedlot facilities for a plant slaughtering 3,000 cattle a week might be several times the value of the plant. There are two instances, however, where feedlot operators have built packing plants.[1]

The Problem of Cooler Capacity

It is important to re-emphasize that this discussion considers plant utilisation levels in terms of kill capacity.[2] It is often the case that some production stages are fully utilised whilst others are not. The president of a national packing firm has stated that chilling and cooling space is usually the limiting factor.

> The capacity of the cooler limits the capacity of a meat packing plant because no plant can slaughter more animals in a day than the coolers will hold that night, regardless of the efficiency of slaughter.[3]

One national packer in Edmonton is at present adding additional cooling capacity which is expected to increase plant utilisation by 25 percent.[4] Some country packing plants and abattoirs operating on a smaller scale of custom slaughter also experience pressure on cooling facilities. One country correspondent explained that his plant required additional freezing capacity to counteract the inability of some customers to collect their kill on the appointed day.[5] For the larger commercial

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[1] This was the direction of development of Monfort, the U.S. packing firm. In Canada, it is also being undertaken by Lakeside Enterprises, Brooks, Alberta, 1972.

[2] See footnote 1, p. 7 , for a definition of "capacity."

[3] A.J.E. Child, Economics and Politics in U.S. Banking.

[4] See Table 1.3, page 8 of this study.

[5] Information from written correspondence, Alberta, 1972.

packers, the pressure on coolers is caused by the necessity of reserving space to age beef according to retailer specifications for the Alberta domestic market. For beef shipped to Eastern Canada, the normal ageing period is about 10 to 16 days, but the Alberta packer generally keeps the meat in his cooler only three days. The ageing process is completed in transit and at destination.[1] Table 4.11 shows the estimated slaughter capacity and utilisation at the major locations in Alberta according to available information.[2]

The Influence of Government Policy

The Department of Regional Economic Expansion (DREE)

The department was established in 1969. Its objective is to reduce regional inequalities in employment and earnings opportunities in the less developed areas of Canada. Development incentives to encourage new productive employment and economic activity constitute a major part of this programme.

> These incentives are not continuing subsidies. They are designed to offset the initial disadvantages of an industrial investment in the areas where additional employment is most needed. They reduce the capital costs of the company, so that it will then be able to operate on an economic basis.[3]

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[1] Hawkins and Manning, op. cit., p. 3.

[2] Industry estimates, Alberta, 1972. It was difficult to eliminate bias from interview information. Table 4.11 suggests that the average provincial capacity utilisation rate (50-60 percent), which some packers quoted, may be pessimistic. Another source estimated that Alberta may be slaughtering 20,000 or 21,000 cattle a week (1972) out of an estimated 25,000 head, which was suggested as the possible maximum from all current facilities.

[3] Department of Regional Economic Expansion (DREE), Canada Development Incentives for Industry in Designated Regions and Special Areas, Cat. No. RE-32-870 (Ottawa: Information Canada 1971), p. 3.

TABLE 4.11

ESTIMATED SLAUGHTER CAPACITY AND UTILISATION AT THE LARGER BEEF PACKING PLANTS IN ALBERTA, 1963 AND 1971-1972

Location	Plant	Annual Capacity[a]	Estimated Weekly Throughput[b]	Plant	Capacity Utilisation	Estimated Weekly Throughput[c]
		(number of cattle)				(Number of Cattle)
Edmonton	Plant A	135,000	2,596	Plant A	50%	1,250-2,000
Edmonton	Plant B	180,000	3,461	Plant B	67%	av.2,450 (1967)
Edmonton	Plant C	35,000	673	Plant C	n.a.	n.a.
Edmonton	Plant D	180,000	3,461	Plant D	n.a.	n.a.
Calgary	Plant A	50,000	962	Plant A	70%	≃ 2,250
Calgary	Plant B	50,000	962	Plant B	75%	av.1,950 (1967)
Calgary	Plant C	35,000	673	Plant C	n.a.	n.a.
Calgary	Plant D	50,000	962	Plant D	Operations closed	
				Plant E	70%	700
Lethbridge	Plant A	60,000	1,154	Plant A	n.a.	≃ 2,200
Lethbridge	Plant B	75,000	1,442	Plant B	80-90%	≃ 3,200
				Plant C	68% (est.)	≃ 2,000
Medicine Hat	Plant A	100,000	1,923	Plant A	n.a.	n.a.
				Plant B	n.a.	n.a.
Red Deer	Plant A	37,000	721	Plant A	90-100%	1,000
				Plant B	80-90%	≃ 2,000

[a] These annual capacity figures appear to be high.

[b] Assuming an 8 hour shift, 5 day work week and 52 operative weeks in the year, the annual capacity figures were divided by 52. The weekly estimates are also too high.

[c] The estimates for 1971 may be overestimates for some plants.

Source: 1963 figures from G. C. Carlson, "Transportation Costs as a Factor in the Competitive Position of Livestock Slaughter Plants in the Prairie Region of Canada" (unpublished M.Sc. thesis, University of Saskatchewan, 1964). 1971-72 figures--various sources of confidential information.

Figure 4.3 shows the DREE incentive or designated region in the south of Alberta. The included locations of interest to the meat packing industry in this province are Lethbridge, Brooks, and Medicine Hat. A company wishing to establish new manufacturing or processing facilities, or to expand or modernise existing plants in such a designated region, may apply for DREE investment grants or loan guarantees.[1] Table D.4.1 in Appendix D shows the maximum incentive grants allowable for each region. Appendix D also gives an explanatory list of conditions and terms attached to the incentives programme, while Table 4.12 indicates the DREE payments (under the Incentives Act) which have been offered to the meat packers who are currently operating, or planning to operate, in Alberta.

The total government cost for the Alberta meat packing industry under the DREE incentives has so far reached $1,306,188, which is 22.21 percent of the total estimated capital cost of $5,880,562 for new expansion and modernisation in the meat packing industry in Alberta. A combination of factors in the situation facing the meat packers at the present time has been causing the industry some concern over this federal government policy.

Most representatives interviewed from the packing industry commented on the current government grants policy and some stated that without such assistance many recent additions to plant capacity may not

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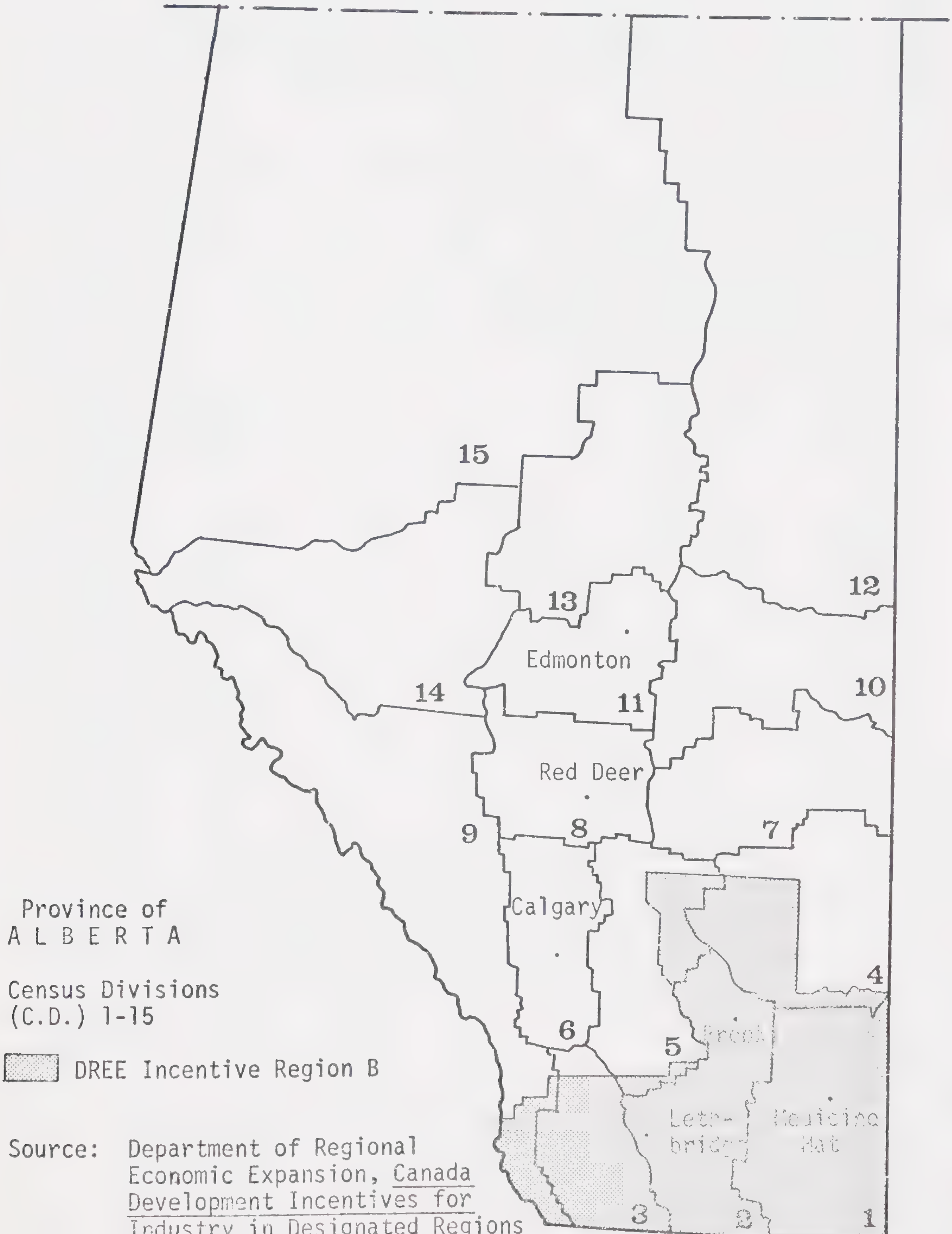
[1] See Appendix D, item 3c, page 159 for explanation. The guarantees tend to apply to hotels, convention centres, recreational facilities, warehousing and freight handling facilities, and are more usual in regions which are already relatively developed.

FIGURE 4.3
DEPARTMENT OF REGIONAL ECONOMIC EXPANSION DEVELOPMENT INCENTIVES PROGRAMME FOR INDUSTRY: THE DESIGNATED REGION IN ALBERTA



Source: Department of Regional Economic Expansion, Canada Development Incentives for Industry in Designated Regions and Special Areas (Ottawa: Information Canada, 1971).

TABLE 4.12

PAYMENTS OFFERED TO THE MEAT PACKING INDUSTRY IN ALBERTA UNDER THE DREE DEVELOPMENT INCENTIVES PROGRAMME[a]

Date	Company	Type of Operation	Location	Total Cost	Jobs Created	Rate of Offer	Government Cost
				($)	(no.)		($)
April 1970	Swift Canadian Co. Ltd.	Beef Slaughtering & Processing (new plant)	Lethbridge	3,551,000	128	12% of approved capital cost +	426,120
						$2,000 per job	256,000
						Total	682,120
June 1970	Canada Packers Ltd.	Hide Processing (new plant & product)	Lethbridge	506,000	21	15% of approved capital cost +	75,900
						$1,200 per job	25,000
						Total	100,900
June 1970	Canadian Dressed Meats	Abbatoir & Meat Processing	Lethbridge	257,512	6	12% of approved capital cost	30,901
"	" "	a)expansion b)new product	"	300,000	21	12% of approved capital cost +	36,000
						$3,000 per job	60,000
						Total	126,901
Sept. 1970	Lakeside Milling Ltd.	a)Livestock & Poultry Processing	Brooks	568,450	14	15% of approved capital cost +	85,267
						$3,000 per job	42,000
"	Lakeside Packers Ltd.	b)Packing Plant	"	695,600	55	15% approved capital cost +	104,340
						$3,000 per job	165,000
						Total	396,607
GRAND TOTALS	4 companies		2 locations	5,880,562 capital cost	245 jobs	Total Government Cost	1,306,188

[a] For other new industrial capital investment in Alberta not eligible for the DREE incentives, see Table 1.3, page 8 of this study.

Source: Department of Regional Economic Expansion, Investment Grants and Offers Accepted, Monthly Reports (Ottawa: Information Canada, 1969-1972).

have occurred. It did not always appear clear, however, if a distinction was being made between the addition of new capacity and the modernisation or expansion of existing facilities.

The problem of excess capacity and its possible connection with government grants is being publicised by some industry representatives:

> The Lethbridge plant of Canadian Dressed Meats had its earnings drastically reduced during the year by the opening of a third meat packing plant in the city. The existing two plants were not operating at capacity, so there is little if any extra employment generated by the new plant which was built with substantial assistance from the federal government. All three plants of course are now in an unsatisfactory profit position which will not be eased until there is a substantial increase in the number of cattle in the Lethbridge area.[1]
>
> As to the beef situation in 1971 it is uncertain whether there will be any great increase in cattle marketings. This means that the present surplus capacity of beef facilities, with resultant inefficiencies, will still persist...It seems highly improper to use Federal funds to worsen an already inefficient situation. Present cattle slaughtering capacity on a one shift basis in Alberta is about 25,000 head a week, actual average slaughter in 1970 was 17,000 head a week and no great increase is expected.[2]

This might suggest that the capital subsidies may be affecting the allocative ability of the market by causing an excess of resources to move into the Alberta meat packing industry at the present time.

One of the ways in which the DREE programme tries to encourage economic growth in designated areas is to improve the quality and the quantity of the factors of production.[3] Table 4.12 indicates that the

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[1] Burns Foods Limited, Annual Report (Calgary: Burns Foods Limited, 1971), p. 4.

[2] Burns Foods Limited, Annual Report (Calgary: Burns Foods Limited, 1970), p. 5.

[3] The attempt to improve the characteristics of factors of production is a more dynamic interpretation of economic growth that that of the Agricultural Rural Development Act (A.R.D.A.), which primarily focused on unemployment and full utilisation of available regional resources.

DREE programme is subsidising capital in the meat packing industry. In theory, a capital subsidy lowers the price of capital relative to that of other factors of production, such as labour.

FIGURE 4.4

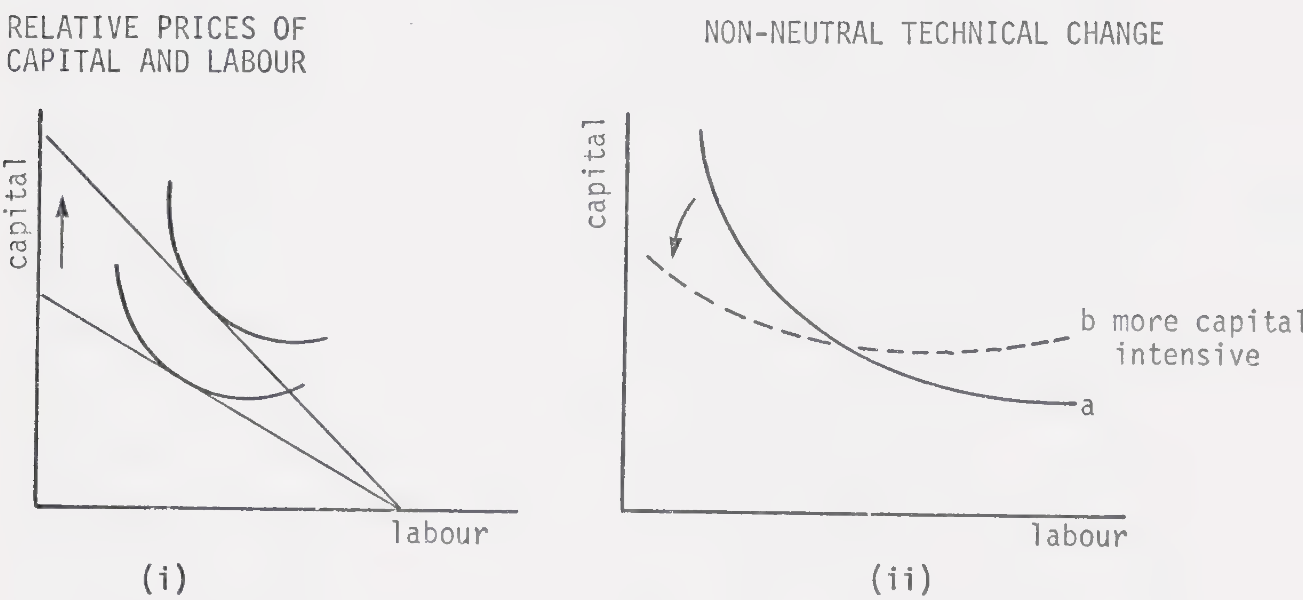

Figure 4.4 (i) shows a reduction in the price of capital relative to that of labour. This may encourage the use of more capital (as far as technology will permit), which would increase output. In Figure 4.4 (i) the slope of the isoquant (representing the marginal rate of substitution between capital and labour) is unchanged; therefore, technical change can be described as neutral, since the relationship between the marginal physical products of both factors does not change.

If, however, the capital injected into the meat packing industry involves a change in technology, there will be a non-neutral technical change in the production function as shown in Figure 4.4 (ii). The marginal physical product of capital has increased relative to that

of labour. Such a change would occur if, for example, new and more efficient machinery were used. It would appear that the underlying technology of the meat packing industry has allowed the packers to take advantage of the DREE capital subsidies to substitute capital for labour in the production process. (On the rail processing, automatic knives, etc.). The DREE subsidies per job created, however, may represent an attempt to offset the tendency to take advantage of capital as a less expensive factor, since, if it is relatively easy to substitute capital for labour, the wage bill may decrease. DREE, however, also aims to increase employment and earnings opportunities in designated areas.

The DREE programme applies to the area of Alberta where the supplies of feeder cattle and cattle numbers in general have, in fact, been expanding (Tables 4.2, 4.5A, and A.3.9). Most of the new industry investment has been at Lethbridge (Table 4.12). It seems possible that the programme may have encouraged the closure of obsolete plants and the modernisation of existing equipment.

There has been some discussion of the proposed development of a packing plant at Brooks. All the information from the packers suggests that the distance of 94 miles from Brooks to Lethbridge is well within the procurement area of even a moderate sized packing plant. The minimum procurement radius seems to be about 150 miles around the plant. In addition, despite the packing industry development injected into the Lethbridge area in 1962 and again during 1969-1970, the rate of increase in livestock production has continually failed to fulfil expectations. One of the national packers has remarked on a general attitude of "over optimism" and another national packer has remarked that none of the

three plants now at Lethbridge is operating at capacity.[1] Bearing this in mind, it is difficult to discover the rationale behind the DREE subsidies of $396,607 at Brooks for capital and labour employed in the plant, unless factors other than the amount of capacity already in the southern area impinged on the decision. There may be some concern about creating employment in this area, for example, since the subsidies per job created are the highest in the province (Table 4.12).

It is not altogether clear if consideration has been given to possible linkage effects between slaughtering and meat packing and other sectors of the regional economy. Perusal of the DREE monthly reports reveals that, in general, grants to the Prairie region have tended to be for heavy machinery concerns, animal feed processing, and other industries involving backwards linkages from primary manufacturing.[2] Grants to Ontario and Quebec, on the other hand, have tended to be more consumer goods oriented, such as processed foods, clothing, and electrical and chemical products. There are indications, however, that the meat packers in Alberta may be attempting to diversify their operations. One national packer has established a block ready beef line in Edmonton while a branch of a Toronto-based firm specialising in beef and pork processing, portion-controlled cuts, and oven-ready meats has increased its sales so rapidly in Edmonton over the last two years that expansion is underway.

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[1] Burns Foods Limited, Annual Report, 1970, p. 4.

[2] Statistics Canada defines any industry which buys 50 percent of raw material input from natural resource-based industries as primary manufacturing; also, DREE Monthly Reports, Ottawa, 1971-1972.

It might be thought that the DREE programme could be affecting the competitive environment in the meat packing industry by altering the concentration ratio (in terms of the number of cattle slaughtered). Table 4.12 shows that most of the assistance has so far gone to the three national packers. It seems to be the case, however, that the independent beef packers still create effective competition in their own areas. The smaller slaughterers and the commercial packers are catering for different segments of market demand. The smaller independents tend to be rural based and most of their business is farm, custom and home freezer kill. The larger packers, however, are competitively seeking cattle supplies in the same areas to satisfy the demand for beef from the metropolitan consumer and the export market.

The Feed Freight Assistance Policy

Another government policy which may affect indirectly the location and operation of Canada's beef packing industry is the Feed Freight Assistance Policy on grain. It has been suggested that the Feed Freight Assistance Policy may affect the location of beef cattle production to some extent, in terms of provincial competitive advantage, since it alters the transfer cost between regions on grain, which is a major input in livestock production. Table A.3.2 may partially reflect the impact of such a policy. The subject of feed freight assistance has been discussed in considerable detail elsewhere.[1]

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[1] T. C. Kerr, Feed Freight Assistance, p. 33; T. C. Kerr, Determinants of Regional Livestock Supply (Ottawa: Agricultural Economics Research Council of Canada, July, 1968), p. 8-11; Lerohl et al., op. cit., preface and p. 17.

Costs of Operation and Profitability: Some Considerations With Respect to the Beef Packing Industry in Alberta

Labour Costs

Table 4.13 shows consolidated statements of profit and loss as presented by the major packing firms in their annual reports. Over the past decade, the percentage share in the value of sales of each cost and expense item has shown little variation. The levels of sales and expenses on the livestock operations of a diversified Canadian packing company are shown in Table 4.14. The situation is similar for American packers. In 1964, the cost of their raw materials was 73 percent of the value of sales; wages and salaries accounted for 13.1 percent of the value of sales.[1] The frequent allusion by packers to labour costs in the annual company reports suggests that the escalation of this component of variable cost is causing them some concern, since the industry has a higher labour use rate than other manufacturing industries (Table E.4.1, page 163).[2] In 1972, unionised labour in the industry received an increase of 27 cents an hour. But, as one packer explained, fringe benefits account for about 25 percent of the average wage packet, so the total increase is probably nearer 32.6 cents an hour. Previously, Burns Foods negotiated wage settlements costing $2,700,000 for 1969 to 1971 and a wage increase of 8.6 percent (29.73 cents an hour) in 1970. Canada Packers faced a 9 percent increase in labour costs in 1970.

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[1] J. R. Ives, The Livestock and Meat Economy of the United States (Chicago, Illinois: American Meat Institute, 1966), p. 219.

[2] Appendix F provides a brief outline of packing plant technology and methods of operation at the various production stages. This is to assist understanding of the discussion on industry operational costs. Tables preceded by "E" are included in Appendix E.

TABLE 4.13

STATEMENTS OF CONSOLIDATED PROFIT AND LOSS[a]

Item	1962 Canada Packers	% of Sales	1962 Burns Foods	% of Sales[b]	1971 Canada Packers	% of Sales	1971 Burns Foods	% of Sales
Invoice value of sales	$576,803,230							
less transport charges and duty	18,327,351							
Value of Sales - f.o.b. plant (net)	558,475,879	100.00	$142,173,696	100.00	$919,178,000	100.00	$359,300,748	100.00
Cost of livestock and raw materials	419,779,409	75.17	112,502,046	79.13	687,233,000	74.77	277,854,876	77.33
Packages and supplies	27,615,179	4.94	5,359,948	3.77	39,822,000	4.33	12,488,360	3.48
Salaries, Wages & Benefits	64,923,709	11.62	18,482,580	13.0	111,355,000	12.11	43,912,701	12.22
Selling & Operating Expenses	29,184,519	5.23	8,341,082	2.35	53,053,000	5.77	15,704,664	4.37
Depreciation of Fixed Assets	3,834,267	0.69	1,208,477	0.85	6,422,000	0.70	2,970,838	0.83
Provision for Taxes	8,067,153	1.44	511,825	0.36	12,215,000	1.33	3,049,049	0.85
Total Expenses					910,100,000	99.01		
Profit from Operations	5,071,643	0.91	298,566	0.21	9,078,000	0.99	2,906,172	0.81[c]
Net Earnings for Year	5,071,603		607,414		9,589,000	1.04	3,133,984	
Earnings per Share					$1.60		$1.24	

[a] Where possible company reports have been made comparable. These statements include all the accounts of the companies and subsidiaries but the meat packing business has the largest share of operations. The accounts of Swift Canadian Co. Ltd. are difficult to compare. In 1968, sales were $2,827,126,887; cost of goods sold $2,612,010,240 (92.39 percent of sales); selling and administrative expenses, $182,855,145 (6.46 percent of sales); earnings before tax, $26,722,295; net earnings (loss), $41,567,267; net earnings (loss) per common share, $3.54. Since 1968, the company has undergone a large reorganisation and has now a better performance. Swifts is a much more diversified enterprise in which meat packing is a smaller part of total operations.

[b] Items do not add to total because of rounding errors in estimates.

[c] 0.11 percent of sales was interest on long-term debt.

Source: Canada Packers Limited, Annual Reports (Toronto: Canada Packers Limited, 1962, 1971). Burns Foods Limited, Annual Reports (Calgary: Burns Foods Limited, 1962, 1971).

TABLE 4.14

PROFIT AND LOSS STATEMENT OF A COMPANY'S OPERATIONS ON ALL PRODUCTS DERIVED FROM LIVESTOCK, 1962

Item	($)	Percentage of Livestock Sales
Value of Sales	316,300,000[a]	
Cost of Livestock	248,400,000	78.53
Cost of Materials & Packaging	12,600,000	3.98
Other Expenses (selling expenses, wages, benefits, etc.)[b]	52,000,000	16.44
Total Expenses	313,000,000	98.95
Profit before Taxes	3,300,000	1.04
Income Taxes	1,800,000	0.56
Profit from Operations	1,500,000	0.47

[a] This figure represented 55 percent of the company's total sales in all divisions.

[b] No other details were given about what these "other" expenses involved.

Note: Profit represented 1/6¢ per lb. of product sold. Of the total assets on the balance sheet, 36 percent were employed in the livestock section of the business.

Source: Canada Packers Ltd., Annual Report (Toronto: Canada Packers Ltd., 1962), p. 7.

The inability of the packers to greatly reduce the labour share of variable costs (Table 4.13) despite some apparent substitution of capital for labour (Table 4.12) necessitates a sustained effort to improve labour productivity. At present, there seems to be a trade-off between using labour intensively for maximum productive efficiency and trying to "spin-out" available throughput in periods of short supply. This involves the use of "slow gangs" on the slaughter floor and unproductive chores. Williams and Stout maintain that labour productivity in the packing industry has lagged when compared with other processing industries.[1] Reference to Table 4.15, however, shows that the packing industry has recorded an average performance in terms of value added per wage worker, in comparison with some other industries. A similar situation occurs as far as value added per wage dollar is concerned. Regional differentials in wage rates may have some influence on choice of plant location, as packers must pay competitive rates to compete with other industries for labour. Some regional differentials in average weekly wages in some provinces are shown.

TABLE 4.16

REGIONAL DIFFERENTIALS IN AVERAGE WEEKLY WAGES IN CANADA

Year	Quebec	Ontario	Alberta	Canada
		($)		
1964	84.51	89.93	86.70	86.68
1965	88.71	94.54	90.98	91.19
1969	114.24	121.55	117.95	117.63
1970	122.38	131.52	128.15	126.82

Source: Statistics Canada, Canadian Statistical Review, Cat. No. 11-003 (Ottawa: Queen's Printer, 1966, 1970).

[1] Williams and Stout, *op. cit.*, p. 368.

TABLE 4.15

FINANCIAL RATIOS REFLECTING THE RELATIVE PROFITABILITY AND PERFORMANCE OF THE ALBERTA MEAT PACKING INDUSTRY IN COMPARISON WITH OTHER SELECTED MANUFACTURING INDUSTRIES IN THE PROVINCE

Industry	1968			1964		
		Value Added			Value Added	
	Price/Cost Margin[a]	Per Wage$[b]	Per Wage Worker[c]	Price/Cost Margin	Per Wage$	Per Wage Worker
		$	$		$	$
Food & Beverages	13.09%		11,829	14.32%	2.27	9,875
Slaughtering & Meat Processing	8.01	1.97	12,549	8.56	2.00	10,471
Dairy Products	13.89	1.87	,868	10.04	2.18	8,152
Feed Manufacturers	9.68	2.09	11,916	12.54	2.44	10,515
Bakery Products	22.95	1.69	7,465	28.18	1.97	7,161
Breweries	58.17	4.88	35,266	51.77	4.15	23,287
Other Food Processors	24.07	3.37	14,866	24.93	3.68	16,050
Textiles	18.89	1.70	9,772	14.05	1.60	7,389
Paper & Allied Products	24.93	2.42	16,047	30.96	2.63	13,860
Agricultural Implements	15.12	1.50	7,873	17.59	1.40	7,015
Petroleum Products	17.55	4.12	33,663	17.41	4.31	29,779
Chemicals	39.61	3.48	26,240	40.37	3.62	22,084
Other Manufacturing	27.97	2.13	10,676	25.19	2.04	8,688
Totals Alberta	19.97	2.20	12,433	21.18	2.31	10,622

[a] Value added less payroll divided by value of shipments; where value added does not include inventory changes of "goods in process" or "finished goods." Value added is the net value of production where the costs of all materials, supplies, fuel, electricity are deducted from the total value of output.

[b] Value added divided by the payroll.

[c] Value added divided by the number employed. b and c are crude proxies for a productivity index.

Source: Calculated from Department of Industry and Tourism, Alberta Industry and Resources (Edmonton: Alberta Bureau of Statistics, 1968, 1970), pp. 22-23; also from S.M.H. Rizvi, "Dimensions and Performance of Some Important Sectors of the Canadian Agri-business System" (unpublished information, Ottawa: Agricultural Economics Research Council, 1971).

Other Site Costs

The packing industry is also a high user of public utilities (Table E.4.1). The city of Edmonton has caused the packers some concern by increasing the penalties for water pollution (for example, the level of suspended solids) and the cost of sewage by 15 percent. One packer estimated this would add about 2 cents to consumer meat prices. In Calgary, there is a similar situation. In Toronto and Montreal, as pollution control costs escalate, the increase in the costs of public utilities to the packers may be an important factor to be considered when choosing a plant location.

The Effect of Capacity Utilisation on Plant Costs

A study of Australian export abbatoirs substantiates industry evidence from Canadian packers that utilisation of capacity is one factor affecting profitability through costs of operations.[1] The Australian study was a statistical analysis of the effect on costs of changes in annual throughput, the average utilisation of capacity and the variability of utilisation of capacity. The study included consideration of the age and standard of plant construction, which affects the contribution of fixed costs to unit costs; the variability of throughput; and economies of scale which, in theory, should result in a tendency for all per unit costs to fall over certain ranges.

In 1969, the study found that an abattoir with an average capacity utilisation of 65 percent had a cost advantage per unit of

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[1] S. A. Parsons and J.W.B. Guise, "An Analysis of the Costs of Operation of Export Abattoirs in Australia," Quarterly Review of Agricultural Economics, Vol. 24, No. 1 (January, 1971), p. 47. This is one of the few recent studies which has been able to obtain sufficient data for an analysis of slaughter plant costs.

$0.20 and $0.73 (Australian) over abattoirs with an average utilisation of 45 and 25 percent. This suggested that abattoirs should seek to attain a high average capacity utilisation to secure savings in the unit costs of interest on capital plus depreciation. The results also indicated that for the ranges of annual throughput considered (26,000 to 223,000 cattle equivalent (C.E.) units, 18,000 to 155,000 C.E. units, and 10,000 to 86,000 C.E. units), the greatest unit savings were achieved at annual throughputs of less than 60,000 C.E. units per annum. Further unit savings were indicated for higher annual throughputs, although they tended to diminish rapidly as annual throughput increased. The study's conclusion may verify, to some extent, some accuracy in the contention of the Canadian beef packing industry that little apparent advantage is gained by constructing larger plants--in other words, economies of scale are moderate.[1]

Parsons and Guise[2] also suggested that the failure to match capacity with available slaughter volume resulted from the difficulty of projecting long-term growth in livestock supplies; the increase in capacity caused by new technology and stricter inspection; and the fact that any increase in unit costs of operation (as a result of a

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[1] Child, Economics and Politics, p. 107; see also Table D.4.2. This table was compiled in 1965 and it is probably subjective. Some indication of capital costs needed to enter or expand in the meat packing industry can be seen from Tables1.3 and 4.12. One industry source suggested that any advantages gained from large scale capital equipment in terms of cost savings may be offset by increases in other expenses, such as higher livestock prices and costs of procurement, wages, and utilities costs, etc.

[2] Parsons and Guise, op. cit., p. 55.

low average utilisation of facilities, for example) may be offset by the profit advantages that can be derived by having the capacity necessary to cope with peak demand, especially when large numbers of livestock become available in adverse seasonal conditions in the Australian environment. They stressed the importance of balancing cost savings arising from the design of a plant of sufficient scale to achieve high average capacity utilisation and low variability in utilisation, as against possible high unit costs of interest on capital and depreciation. An ability to spread fixed costs over more units of output is desirable.

It is suggested that some of the characteristics of the Australian slaughtering industry are applicable to the Canadian industry. For example, Canadian meat packers also face seasonal variations in the numbers of cattle marketed and the slaughter plants of more recent construction, while smaller than previous plants in terms of physical size, embody technology which increases maximum potential capacity.

Consideration of such problems associated with capacity utilisation helps to explain the attitude of the Canadian meat packers towards the strike at Canada Packers' plants in 1967 and the consequent effect on industry profits.

> The strike at Canada Packers Limited...was clear evidence of the surplus capacity which exists in the meat packing ... while their plants were closed there was no undue strain on the rest of the industry ... Now that all plants are back in operation ... competition for existing supplies of livestock is driving profit margins narrower ... This means that only two kinds of firms will operate profitably: those who are diversified into non-meat lines and those whose efficiency is considerably above average.[1]

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[1] A.J.E. Child, "President's Report," Burns Foods Ltd., Annual Report (Calgary: Burns Foods, 1967); see also Table 4.11 for estimated plant capacities in Alberta.

In 1962 another packer made a similar comment on the strike:

> During that period of time, hardly a ripple was felt, with every available animal being handled efficiently ... and every retailer's requirements filled as ordered. Furthermore, for the first time in many years, meat packing operations were generally profitable as some of the excess capacity in the industry was eliminated.[1]

Profitability of the Beef Packing Industry in Canada

The size of the farm-retail price spread (Figure E.4.1), together with the rising trend in the dollar sales of the meat packing industry (Table 4.13), have frequently provoked the allegation that meat packers receive sizeable profits. The meat packers claim, however, that their industry has "notoriously low" profits. A major part of fresh beef output leaves Alberta packing plants in sides, quarters or large wholesale cuts with little further processing. There is less value added, therefore, to the final product than in other industries. A beef packer's net profit depends more on the difference between the price paid for the live animal and the price realized for the carcase and by-products, less plant and handling expenses.[2] This is a major premise in the packers' claim that "profit margins are low." Table E.4.2 shows the estimated increase in raw material costs in several industries over the last decade. Although raw material costs in meat packing are about 70-80 percent of total costs, this table shows that it is the only industry where sales have increased faster than raw material costs.

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[1] Information by correspondence, Alberta, 1972.

[2] Table E.4.3 shows a typical beef cost sheet presented as evidence by Canada Packers to the Joint Committee on Consumer Credit, 1966.

It may appear that the packing industry's net profits are low, if a ratio of profit to value of sales is considered (Tables 4.13, E.4.4, and E.4.5). However the value of annual sales, as compared with the value of total assets employed, is greater in the meat packing industry than in many other industries. The relationship can be expressed in terms of a ratio--the annual sales turnover of total assets. The "turnover" is about five times a year in meat packing compared with about 1.4 percent a year for all manufacturing industries. A lower profit to sales ratio in meat packing, therefore, need not be financially unsatisfactory, since each time the value of sales covers the value of total assets in a year, this, in effect, spreads a meat packer's fixed costs over a higher volume of output and therefore reduces fixed costs per unit of output.[1]

An attempt was made to compare the financial records of industries operating in Alberta (Table 4.17), but the data were incomplete. Table 4.18 is a more successful attempt to compare the financial performance of various Canadian industries. Canada Packers has a working capital ratio (current assets ÷ current liabilities) comparable with other industries, but that of Burns Foods is the lowest listed. However, Burns Foods' performance with regard to sales increases and the resulting improvement in the profit to sales ratio is satisfactory.

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[1] Problems were encountered in ascertaining the bias in interview information from the industry, since the meat packers do not tend to emphasize the rapidity of their sales turnover to the same extent that they stress their low profit to sales ratio. Table 4.15, p.109 also shows a satisfactory record in meat packing with regard to a crudely estimated price - cost margin, in comparison with other industries.

TABLE 4.17

SOME FINANCIAL RATIOS OF SELECTED INDUSTRIES IN ALBERTA

	1964[a] Earnings as a Percentage of:			1968 Earnings as a Percentage of:		
Industry or Firm	Sales	Assets	Net Worth	Sales	Assets[b]	Net Worth
Burns Foods	0.59	2.7	4.5	0.55	2.6	4.9
Canada Packers	1.0	5.7	9.3	1.0	5.2	8.4
Swift Company	0.96	3.9	6.1	0.54	2.1	4.3
Food and Beverages	n.a.	n.a.	n.a.	n.a.	4.24	n.a.
Wood	n.a.	n.a.	n.a.	n.a.	2.63	n.a.
Metal Fabricating	n.a.	n.a.	n.a.	n.a.	7.75	n.a.
Non-Metallic Mineral Products	n.a.	n.a.	n.a.	n.a.	3.76	n.a.
Petroleum	n.a.	n.a.	n.a.	n.a.	4.22	n.a.
Other Manufacturing	n.a.	n.a.	n.a.	n.a.	1.18	n.a.

[a] The annual accounts of companies are not identically comparable. Reference can be made to Table E.4.5 to compare these results with American business sectors in 1964.

[b] Net value of shipments as a percentage of total capital and repair expenditures in Alberta, 1968.

Sources: Calculated from Burns Foods Ltd., Canada Packers Ltd., Swift and Co., _Annual Reports_, 1964; Statistics Canada, _Public and Private Investment in Canada, Outlook_, Cat. No. 61-206 (Ottawa: Queen's Printer, 1968), p. 25; Alberta Department of Industry and Tourism, _Alberta Industry and Resources_ (Edmonton: Alberta Bureau of Statistics, 1968, 1970), pp. 22-23, 22-23.

TABLE 4.18

SOME FINANCIAL RATIOS OF SELECTED CANADIAN INDUSTIRES, (LAST QUARTER) 1971

Industry	Working Capital Ratio[a]		Percentage Increase in Sales		Rate of Return on Capital Employed[b]		Net Profit Before Income Taxes to Sales[c]		Net Profit to Sales Ratio[d]	
	1970	1971	1969	1970	1970	1971	1970	1971	1970	1971
Total All Industries	1.86	1.88	0.68	13.85	5.13	6.44	5.77	6.60	3.54	4.17
Total All Manufacturing	2.00	2.02	1.09	11.70	4.30	6.69	4.96	6.60	2.68	3.89
Food and Beverages	1.80	1.79	7.18	5.51	7.64	7.87	5.75	5.61	3.03	3.08
Textiles	1.81	1.74	11.06	15.04	3.61	6.46	2.49	4.14	1.61	2.60
Paper & Allied Goods	2.42	2.57	-3.44	6.48	1.69	2.12	3.56	3.52	1.95	2.35
Primary Metals	2.41	2.08	6.55	12.40	4.16	5.43	5.82	7.61	4.64	5.56
Metal Fabricating	2.37	2.48	-4.94	17.45	4.94	10.24	5.57	7.69	2.67	4.43
Non-Metallic Minerals	1.59	1.73	0.78	19.38	4.33	8.15	6.20	9.96	3.58	6.02
Electrical Products	2.04	2.21	5.49	4.22	4.44	7.61	3.68	6.55	1.93	3.36
Petroleum	2.26	2.18	7.77	9.85	6.89	7.73	12.40	11.29	7.06	7.61
Chemicals	2.29	2.45	2.44	9.66	7.24	7.59	7.14	7.24	4.64	4.82
Other Manufacturing	1.66	1.84	13.59	-3.51	6.62	6.77	7.02	7.77	3.60	4.10
Slaughtering & Meat Processing										
Burns Foods Ltd.	1.24	1.31	12.29	12.85	6.04	7.16	1.51	1.65	0.76	0.87
Canada Packers Ltd.	1.87	2.04	10.17	4.37	9.08	7.63	2.62	2.31	1.13	1.04

[a] Current assets ÷ current liabilities--a measure of short-term liquidity.

[b] Net profit or loss ÷ (Total assets - current liabilities) x 100.

[c] Net profit or loss plus provision for income taxes--in statement of revenue and expenses--as percentage of sales.

[d] Net profit or loss as percentage of sales of goods and services.

All data are based on seasonal adjustments and are preliminary estimates.

Source: Statistics Canada, Industrial Corporations, Financial Statistics (Ottawa: Queen's Printer, 1971); Burns Foods Ltd. and Canada Packers Ltd., Annual Reports, 1969-1971.

The packers appear to be achieving a very satisfactory return on capital.[1] Reference to Table E.4.4 gives some comparison between the packing business and other enterprises in the United States, for earnings as a percentage of assets.

Recent Developments in the Beef Packing Industry

The references to innovations and product development in the annual reports of the national packers seem to suggest that diversification into new marketing channels and further processing, which would result in more value added per unit of output, is taking place. Some attempt has been made at more aggressive marketing techniques and product differentiation (ProTen Beef, for example). A block ready beef line and a new processing company in Edmonton and a new plant entirely for beef processing in southern Ontario may indicate a positive change in the attitude of the industry. The downward pressure on packer selling prices by the retail buyers may have been due, in part, to the large volume of product traditionally moved by the packers. This policy may have adversely affected packer bargaining power over price (and, therefore, packer income) when beef was plentiful in the marketing channels. The meat packers have been relatively slow in changing their ideas and they are still cautious. For example:

> In the last few years, much attention has been attracted to some new developments: convenience and snack foods, portion-controlled meats for hotels, restaurants and institutions, block ready beef and meat cuts prepared in packing plants for home consumption... Burns are willing and anxious to

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[1] In Table 4.18, due to data deficiencies, some caution is necessary in comparing the rate of return on capital employed between the two packing firms and the other industries which are aggregated by sector. Sector averaging tends to give a lower figure.

> engage in these new ventures, but only as fast and to the extent that we can do so successfully...Most new projects require technical expertise, able administration and a merchandising organisation which usually must cope with severe competition. Burns will move into new ventures whenever these requirements can be met.[1]

The alleged lack of funds for research and development because of "low profit margins" must be treated with some scepticism, since the last decade in Alberta has been one of great expansion and technological advance. At least two research papers on nutritional analysis and consumerism were presented at the Annual Meeting of the Meat Packers' Council in Montreal in 1972. The annual reports of Canada Packers indicate that the company has an increasing interest in research and development, and that it continues to undertake substantial new investment in the installation of new equipment and new processes.[2]

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[1] Burns Foods Ltd., Annual Report, 1969, p. 4.

[2] Canada Packers Ltd., Annual Report, 1970, p. 7.

CHAPTER V

RECAPITULATION, COMMENTS AND CONCLUSIONS

The study has examined factors affecting the decentralisation of beef packing plants from Eastern Canada's populated consumer markets to Western Canada and has discussed location and operation of beef plants in Alberta. Changes in the location of beef cattle production, the structure of the transportation system, the costs of other inputs, such as labour and utilities, and government regional policy were hypothesized to be factors affecting the choice of packing plant location. The availability of slaughter cattle and utilisation of plant facilities were expected to affect the methods of operation and profitability of beef packing plants.

Shortcomings of This Study

The main problems encountered were the deficiencies in the availability and reliability of sufficiently disaggregated data on the meat packing industry. Official data collection agencies are unable to release such data and the meat packers themselves are extremely reluctant to do so. It was difficult to ascertain and to correct the degree of bias from the interview information that was obtained from various sources. The discussion of capacity utilisation and plant operating costs in particular is incomplete. In practice, the section was modified into a general discussion of industry operating costs. The data limitations and the omission of other meats and poultry from the discussion indicate the need for circumspection in interpreting the conclusions of the study.

Summary of the Method of Approach

Relevant location theory and the conclusions of past research were presented and related to the beef packing industry in Alberta. Secondary data on provincial slaughterings (adjusted for trade movements), the number of cattle on farms and provincial cattle marketings were examined to establish Alberta's competitive position in beef cattle production. Alberta data on the number and types of cattle on farms, distribution of feeder cattle, and cattle marketings by census division were discussed and the location of beef packing plants considered in relation to the evidence presented. The influences on packing plant location of transportation technology, the freight rate structure, government regional policy, regional differentials in the costs of labour, utilities, and other site costs were also discussed. The effect of utilisation of capacity on industry operations was examined and some attempt was made to appraise the profitability of meat packing in comparison with other industries. A demand analysis suggested that projected increases in consumer demand and per capita beef consumption would continue to stimulate the expansion of the livestock-meat industry as a whole.

Conclusions

1. The total provincial cattle slaughter figures on the number of cattle marketed indicated that Alberta has the highest levels of beef cattle production in Canada. Examination of the numbers and types of animals on farms by province further emphasised the specialisation of the Prairies, and of Alberta in particular, in beef production. Data on feeder cattle purchases indicated that more feeders are being

retained for finishing in Alberta. Fewer feeders were shipped to other provinces in 1971 than in previous years. The evidence suggests that Alberta will retain the lead in beef cattle production in future. The supply advantage of Alberta is probably the most important factor in explaining the decentralisation of beef packing plants. Alberta can also supply the needs of the packing industry for high grade cattle and carcases to satisfy consumer preference for high quality meat. About 75 percent of the province's beef production in 1971 was graded choice or good.

2. The distribution of finished beef cattle for slaughter is the most important factor influencing the location of beef packing plants within Alberta. The movement of feeder cattle is a major consideration. The census Divisions in Central Alberta have the largest cattle and calf populations and most of the sales at the Edmonton terminal market are feeder cattle. The Calgary market tends to handle finished cattle from the feedlots in Southern Alberta. Packers in Edmonton stated that they competed with feedlot operators when buying cattle, since animals of lighter weights which are suitable for slaughter are imported into the Southern census divisions for further finishing. This suggests a feeder supply shortage in the Lethbridge area.

Packer optimism seems to have been temporarily excessive with regard to the expected rate of expansion in slaughter cattle supplies in the Lethbridge area, since the available evidence suggests that none of the three larger specialised beef plants in Lethbridge is operating at full capacity. Direct deliveries of cattle, however, from farms and feedlots to packing plants are more important in Southern Alberta and

are still increasing. The consequent ability of the plants to obtain additional slaughter volume from "the country" in this area was cited as a development which has favoured the expansion of Lethbridge as a packing plant centre.

Plant procurement policy seems to be competitive. It was difficult to obtain information on the number of cattle slaughtered by week and the specific feedlots from which packers generally bought their cattle. The reason given for the reluctance to release this information was a desire to prevent competitors from attaining this knowledge.

3. The evidence presented in this study suggests that transportation rates may not exert as great an influence on the location of packing plants as other studies have thought. An important factor which has been under-emphasised is the practice of negotiating freight rates. The rates favourable to meat shipments on high volume routes between Alberta and Eastern Canada are a good example. Agreed charges negotiated between the shipper and the railway in relation to the volume and type of traffic guaranteed on specified routes and the distance to destination can result in substantial rate discounts for dressed beef shipments. Continued cooperation between packers and the railways will promote greater efficiency and flexibility of transportation services which have a favourable effect on the freedom of choice of packing plant location.

Locating plants in closer proximity to slaughter cattle supplies reduces the importance of local transportation expenditures in procuring cattle. In periods of short cattle supply, however, the costs become greater with each extension of the geographic procurement

area as packers search for adequate input volume. The competitive nature of packer procurement policy has a favourable effect on producer cattle prices.[1]

The improvement in the local road networks in Alberta has encouraged better quantity and quality in trucking services. The actual costs of local transportation are probably less than the published rates, since the evidence gathered suggested that rate schedules are frequently disregarded in favour of independent negotiations for specific hauls.

4. Allowing for the bias in industry information on utilisation of capacity, this study concludes that excess capacity is a problem. It is impossible, however, to give a reliable estimate of its extent or its precise effects. There are various possible alternatives in dealing with the situation:

(a) Packers might use more conservative estimates of the number of livestock available and more conservative interpretations of livestock statistics.

(b) Cooperation and exchange of information between beef packers, livestock growers, and feedlot operators would help to "even out" seasonal variations in livestock slaughter supplies, which have caused problems in the regulation of throughput for packers in the past. Some packers do feed a limited number of cattle themselves, or arrange contracts with custom feedlots on the type of feeding programme and the breed of cattle they prefer, as well as the weights of finished animals and time of delivery.

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[1] J.K.Galbraith, American Capitalism: The Concept of Countervailing Power, Revised Edition (Boston: Houghton Mifflin Co., 1956), Chapter IX, pp. 109-134.

(c) Assuming, however, that seasonal supply variations will persist, packers should consider more flexible methods of operation. For example, they could consider reducing the amount of capacity reserved to cope with peak supply periods in favour of operating at near capacity when marketings are smaller. Operations during the supply peaks could then involve overtime and double shifts on the slaughter floor. Possible limitations of cooler capacity could be circumvented by expanding the "kill-ship" type of operation, which would allow meat to move through the coolers more rapidly when necessary.

5. The study concludes that utilisation of capacity is an important factor in plant costs of operation and profitability. This conclusion is, of necessity, based more on an intuitive than an analytical judgement, since data for analysis were difficult to obtain. Important in the meat packing industry is the ability to "spread" fixed costs over more units of output since, for example, there are considerable fixed resources invested in cooler capacity. The more frequently a packer can "turnover" the value of his fixed assets through sales in a year, the more successful will he be in reducing his fixed costs per unit of output. Traditionally, packers have achieved a high ratio of sales to fixed assets. If slaughter cattle are in short supply,not only does plant capacity tend to be under-utilised, but also variable costs per unit of output, such as labour and fuels, increase. Since the value added in beef operations tends to be less than in other packing house operations, there tends to be a lower ratio of profit to value of

sales. The volume of throughput, therefore, is important to beef packers. Despite the existence of excess capacity in beef packing, available financial information suggests that the meat packing industry has a satisfactory record, in terms of returns on capital employed and price-cost margins, in comparison with some other industries.

Packers can improve the profitability of operations by continuing to modernise existing equipment. The move in Alberta from integrated to specialised plants has offset engineering obsolescence. Innovations in methods of operation and technology which accomodate changes in meat marketing will also encourage efficiency.

6. (a) Consideration of the evidence in the study disproved, with one qualification, the hypothesis that government regional policy in the DREE programme has not encouraged an optimal pattern of packing plant location in Alberta. The three national packers with plants in Lethbridge have received the most assistance through capital and labour subsidies, but the increasing density of the slaughter cattle population in Southern Alberta is a valid and important reason for the shift of the specialised beef plants to the same location. The changing location of beef cattle finishing would have encouraged and even forced the packers to move to Lethbridge in any case, regardless of whether DREE assistance was available or not. As a locational incentive therefore, DREE assistance has probably been unnecessary. Considering the relationship, however, between the density of slaughter cattle supply and the usual extension of plant supply areas, this study considers that the DREE assistance to the packing plant at Brooks may result in a non-optimal location, since Brooks is well within the Lethbridge plants' supply area. None of the Lethbridge plants is working at capacity and the additional competition for supplies which the Brooks plant will create can be expected to lead to problems of inadequate slaughter cattle supply in the short run.

(b) The DREE programme has also encouraged the modernisation of plant equipment. The availability of capital subsidies was probably an influential factor in the closure of an obsolete plant in Calgary in favour of a new plant at Lethbridge. The design and technology embodied in modern packing plant machinery are likely to reduce its inherent indivisibility and to allow more flexibility in coordinating the different production stages within a plant, which is conducive to greater productivity and a more efficient utilisation of equipment. The newest plant in Lethbridge, for example, will probably capture more potential economies as its production pattern is established, in terms of organised sources of cattle procurement and distribution outlets.

(c) It seems necessary that DREE should consider separately the impacts of its programme on the slaughtering and packing sector of the meat packing industry and on the processing sector. Because there seem to be more than adequate slaughtering facilities in Alberta at the present time, future assistance to this sector of the industry should be carefully considered. Further expansion in this sector, which is presently operating at under-capacity, may have adverse effects on the industry's balanced development in Alberta, and such results would call the usefulness of the DREE programme into question. If, however, the DREE assistance were realigned more in favour of encouraging further processing before dressed beef left the plants or the region, more value would be added to the final product. Potential cost savings may result inasmuch as the freight rates on non-suspended meat products are lower than the rates on suspended meats. An increase in the movement of smaller cuts of beef or packaged products would, in all probability, stimulate further

negotiation of freight rates to accomodate such a development. While this study considers that DREE assistance could be more effectively distributed between sectors in the industry, it is not suggesting diversification along traditional lines, as at Edmonton and Calgary, where there are multi-species plants. The suggested developments in beef processing should be limited and selective according to appraisals of their potential profitability.

(d) The processing sector of the meat packing industry tends to be more labour intensive than the slaughtering and packing sector which uses on-the-rail systems and other labour-saving devices. In an expanding processing sector the experienced cutters, trimmers, and packagers required would result in more labour being retained in the industry. At present, DREE capital subsidies to slaughterers and packers are encouraging the substitution of capital for labour, despite the offsetting tendency of subsidies per job created. Expansion of employment is also beneficial to a region's economic development.

(e) The national packers have already made some effort to differentiate their products and one company in particular has attempted to promote its own branded beef product. Similar market opportunities still exist as there is a continuing consumer demand and preference for convenience foods. It is essential that the packers produce commodities for which there is a demand; marketing and sales organisations could be modified and oriented towards market research, promotion techniques, and strategy. In view of the continuing strong consumer demand for beef, this study does not conclude that the DREE programme

should cease to encourage a flow of resources into the industry altogether, but that the flow of resources should be realigned and that the criteria and policy objectives on which assistance is based, be reexamined. DREE should also be concerned with the impact of its programme on the competitive environment in the Alberta meat packing industry when considering future applications for grants, since the concentration is already high in comparison with other industries. The benefits of financial assistance granted so far have accrued mainly to the three national packers.

Recommendations Concerning Further Research

More research is needed to gain information on packing plant costs of operation. The data currently available are inadequate for an analysis which might reveal suspected inefficiencies or marketing problems in the meat packing industry. To gain the cooperation of the packers, the experience gained from this study emphasizes the necessity of "public relations" efforts, involving the design of investigations of immediately discernible interest to the packers themselves. There has been some suggestion that the industry may be prepared to consider the impartial credentials of an agency such as the Agricultural Economics Research Council of Canada.

Possible projects might include methods to further improve capacity utilisation and coordinated, innovative marketing strategies. The potential of centralised beef preparation systems, for example, deserves further study, since the problems encountered by American packers must be defined and avoided in the Canadian context.

Closer cooperation between researchers and the industry could result in objective approaches to current problems and the exploration of opportunities which would benefit the packers, the livestock producer, the consumer, and the economy in general. The success which permits complacency has not yet been achieved.

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APPENDIX A

TABLE A.3.1

NUMBER OF CATTLE SLAUGHTERED IN INSPECTED AND UNINSPECTED ESTABLISHMENTS, 1960-1971

Year	Maritimes[a]	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Canada
				Inspected Slaughter				
1960	27,112	236,396	669,118	362,581	102,795	440,431	103,270	1,941,703
1961	35,165	207,792	664,916	389,283	119,410	534,173	90,734	2,041,473
1962	41,701	209,436	707,841	324,581	112,569	562,166	69,865	2,028,159
1963	35,508	208,392	758,128	331,183	115,972	606,293	71,240	2,126,716
1964	38,782	236,347	859,541	393,231	133,887	686,084	74,388	2,422,260
1965	44,889	263,597	981,233	470,420	150,943	746,674	76,758	2,734,514
1966	38,004	205,253	930,122	462,907	168,906	813,669	86,278	2,705,139
1967	36,200	196,407	877,536	450,690	152,984	846,419	81,552	2,641,788
1968	30,621	217,429	915,319	467,666	156,037	899,931	97,376	2,784,379
1969	30,212	227,516	923,126	428,085	162,311	860,475	86,842	2,718,567
1970	32,111	238,929	896,922	422,236	153,845	895,320	61,470	2,700,833
1971	36,905	198,528	915,126	425,296	155,722	1,015,967	39,364[c]	2,786,908
				Uninspected Slaughter				
1960	33,000	79,000	95,000	4,200	11,900	28,100	20,500	271,700
1961	32,400	78,500	99,000	4,300	12,100	27,700	20,500	274,500
1962	30,000	92,300	107,000	4,000	11,200	27,300	26,500	298,300
1963	33,600	96,000	100,000	4,700	10,700	25,800	25,500	296,800
1964	34,700	89,000	87,000	4,600	11,800	28,900	27,500	283,500
1965	38,600	98,500	87,000	7,000	11,500	33,000	35,000	310,600
1966	41,200	93,000	91,000	8,300	13,000	33,000	37,600	317,100
1967	32,000	78,500	84,000	7,300	14,200	32,000	37,000	285,000
1968	38,100	84,000	63,100[b]	7,900	14,200	35,200	37,050	279,550
1969	34,200	64,000	133,323	7,600	12,500	32,300	49,305	333,228
1970	30,450	61,000	131,851	7,200	12,700	27,500	34,900	305,601
1971	30,025	59,000	132,875	7,100	11,600	32,100	29,200	301,900

[a] Does not include Newfoundland.

[b] Stricter provincial inspection forced many plants to meet new standards or to cease operations.

[c] Many smaller slaughtering plants ceased operations in 1971 (information from Statistics Canada.

Source: Statistics Canada, Livestock and Animal Products Statistics, Cat. No. 23-203 (Ottawa: Queen's Printer, 1960-1970).

________________, Livestock Estimating Unit, Agriculture Division (unpublished information, Ottawa, 1972).

TABLE A.3.2

MOVEMENT OF LIVESTOCK BY RAIL FROM WINNIPEG AND POINTS WEST THEREOF TO EASTERN CANADA[a]

Year	ONTARIO				QUEBEC				MARITIMES				Totals moving East
	Slaughter	Feeding	Stock-yards	Total	Slaughter	Feeding	Stock-yards	Total	Slaughter	Feeding	Stock-yards	Total	
					(number of head)								
1960	61,037	75,055	22,985	159,077	58,209	1,218	1,489	60,916	2,481	177	--	2,658	Slaughter: 121,727 Feeder: 76,450 Stockyard: 24,474 Total: 222,651
1961	53,930	88,315	26,312	168,557	36,099	2,619	1,994	40,712	3,392	203	--	3,595	93,421 91,137 28,306 Total: [illegible]
1962	30,018	48,363	15,181	93,563	21,307	1,023	740	23,070	1,402	58	--	1,460	52,727 49,444 15,921 Total: 118,092
1963	30,732	53,639	18,073	102,444	22,940	1,300	668	24,908	2,105	16	--	2,121	55,777 54,955 18,741 Total: 129,473
1964	53,919	88,405	34,200	176,524	25,787	1,581	416	27,784	4,057	--	--	4,057	83,763 89,986 34,616 Total: [illegible]
1965	62,673	104,033	29,526	196,232	27,590	674	1,521	29,785	3,388	616	41	4,045	93,651 105,323 31,088 Total: 230,062
1966	77,369	104,533	28,559	210,481	32,218	1,333	2,982	36,533	3,624	169	--	3,793	113,211 [illegible] 31,541 Total: 250,807
1967	72,407	126,211	39,806	238,424	37,939	1,852	2,613	42,404	3,017	132	--	3,149	113,363 [illegible] 42,419 Total: [illegible]
1968	76,063	104,895	20,838	201,796	35,280	1,023	2,982	39,285	1,095	137	--	1,232	[illegible] 106,055 23,820 Total: [illegible]
1969	98,275	54,154	12,342	164,771	21,229	914	759	22,902	75	--	--	75	[illegible] 55,068 13,101 Total: [illegible]
1970	99,986	46,810	18,765	165,561	14,409	915	1,054	16,378	--	--	--	--	114,395 47,725 19,819 Total: 171,939
1971	73,361	34,591	16,313	124,193	7,543	26	220	7,789	--	65	--	65	80,904 34,682 16,533 Total: [illegible]

[a] This table underestimates Prairie cattle exports to Eastern Canada by the number of head moved by truck. There are no data available to make any such estimates. It does not include Newfoundland in the Maritimes total.

Source: Canada Department of Agriculture, Annual Livestock Market Review (Ottawa: Queen's Printer, 1960-1971).

TABLE A.3.3

ESTIMATED LIVE CATTLE FLOWS FOR SLAUGHTER FROM ALBERTA TO BRITISH COLUMBIA, 1960-1971[a]

Year	Number of Head
1960	36,892[b]
1961	36,892[b]
1962	36,323
1963	37,952
1964	36,400
1965	31,008
1966	39,708
1967	31,511
1968	36,054[c]
1969	40,596
1970	24,065
1971	4,879[d]

[a] Figures for 1962-1967 were obtained from the British Columbia Department of Agriculture Report, page 29, quoted below. Figures for 1969-1971 were taken from the Annual Reports of the Alberta Public Stockyards.

[b] Based on the average flow for 1962-1964.

[c] Based on the average flow for 1967 and 1969.

[d] Many smaller slaughtering plants in Vancouver have been closed (information from Statistics Canada).

Source: British Columbia Department of Agriculture, The Beef Cattle Industry of British Columbia (May, 1969).

Canada Department of Agriculture, Edmonton, Calgary and Lethbridge Livestock Market Reports (Edmonton, Calgary and Lethbridge: Canada Department of Agriculture, 1969-1971).

TABLE A.3.4

ESTIMATED CONSUMPTION OF BEEF IN CANADA BY PROVINCE 1960-1971[a]

Year	Maritimes	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Canada
1960	99.330	359.940	427.770	63.420	64.050	90.370	112.140	1250.900
1961	101.520	370.760	439.638	65.001	65.213	93.906	114.845	1285.779
1962	103.664	381.878	451.556	66.550	66.123	97.336	118.026	1321.251
1963	109.072	407.238	481.538	70.511	69.322	104.243	126.236	1406.573
1964	117.115	443.370	526.501	76.145	74.795	113.463	138.553	1531.626
1965	123.728	475.266	467.477	80.674	79.420	121.220	150.229	1642.238
1966	124.636	486.182	585.420	80.988	80.316	123.038	157.603	1683.261
1967	124.824	492.912	600.516	80.892	80.472	125.160	163.548	1714.020
1968	131.024	519.798	640.736	85.157	84.192	133.830	176.014	1819.248
1969	132.124	527.789	657.266	86.348	84.584	137.680	182.309	1857.580
1970	128.550	515.314	654.491	84.072	80.729	137.120	183.141	1832.008
1971	131.480	524.007	679.124	85.857	80.643	141.995	190.832	1884.079

[a] These estimates are crude in that the national average per capita beef consumption figures probably are not the same in every province. The reported figures were: 70 lbs. in 1960, 70.15 in 1961, 71.1 in 1962, 74.3 in 1963, 79.4 in 1964, 83.6 in 1965, 84.1 in 1966, 84.0 in 1967, 87.7 in 1968, 88.2 in 1969, 85.7 in 1970, 86.9 in 1971. No account was taken of canned and frozen stocks on hand because of their relative insignificance.

Source: Calculated from Statistics Canada, Estimates of Production and Disappearance of Meats, Cat. No. 32-220 (Ottawa: Queen's Printer, 1960-1971); Canada Year Book (Ottawa: Queen's Printer, 1965, 1970-1971).

TABLE A.3.5

BEEF CATTLE: NET EXPORTS IN '000 POUNDS ALLOCATED ON BASIS OF SHARES IN PRAIRIE SLAUGHTER[a]

Year	Manitoba	Saskatchewan	Alberta
1960	40.437	12.655	51.668
1961	82.464	27.564	117.774
1962	69.252	26.085	124.232
1963	34.700	13.094	65.305
1964	17.876	6.541	32.117
1965	89.063	30.288	145.403
1966	63.304	24.419	113.754
1967	19.128	6.985	36.698
1968	28.744	10.282	56.533
1969	9.292	3.729	19.043
1970		Net Import Year	
1971		Net Import Year	

[a] The average warm dressed weights of inspected slaughter were used (see note a to Table 3.2, p.38). The difference between warm dressed carcase weights and the cold dressed import weights was assumed to be insignificant and was therefore disregarded for simplicity of calculation.

Source: Calculated from Statistics Canada, Livestock and Animal Products Statistics, Cat. No.23-203 (Ottawa: Queen's Printer, 1960-1970); Statistics Canada, Livestock Estimating Unit, Agriculture Division (unpublished information, Ottawa, 1972).

TABLE A.3.6

FRESH, CHILLED OR FROZEN BEEF: NET EXPORTS ('000 LBS.) ALLOCATED TO EACH PRAIRIE PROVINCE ON THE BASIS OF SHARE OF PRAIRIE SLAUGHTER

Year	Manitoba	Saskatchewan	Alberta
1960	2.218	0.694	2.834
1961	6.452	2.156	9.214
1962	0.483	0.182	0.867
1963		Net Import Year	
1964	7.648	2.798	13.740
1965	29.767	10.123	48.597
1966	18.584	7.168	33.394
1967	4.101	1.498	7.867
1968	13.921	4.980	27.380
1969		Net Import Year	
1970		Net Import Year	
1971		Net Import Year	

Source: Refer to Table A.3.5.

TABLE A.3.7

FRESH, CHILLED OR FROZEN BEEF: NET IMPORTS ('000 LBS.) ALLOCATED ACCORDING TO SHARE OF EACH DEFICIT REGION IN THE TOTAL ANNUAL DEFICIT

Year	Maritimes	Quebec	Ontario	British Columbia
1963	0.383	1.342	0.171	0.503
1969	9.608	37.593	11.526	12.865
1970	6.035	23.905	8.288	9.630
1971	0.465	1.917	0.619	0.770
	BEEF CATTLE IMPORTS: CONVERTED TO '000 LBS.			
1970	1.038	6.209	2.152	2.501
1971	1.635	6.745	2.179	2.709

Source: Refer to Table A.3.5.

TABLE A.3.8

TWO DIFFERENT ESTIMATES OF TOTAL NUMBERS OF CATTLE SLAUGHTERED IN BRITISH COLUMBIA[a]

Year	Statistics Canada	British Columbia Department of Agriculture
1962	96,365	106,714
1963	96,740	111,055
1964	101,888	116,926
1965	111,758	121,843
1966	123,878	136,313

[a] Comparing these figures, it seems likely that the official figures for British Columbia for total slaughter (inspected and uninspected) are underestimates, in that some of the uninspected slaughter is not recorded. The British Columbia beef deficit, therefore, may be less than the official figures suggest, although the difference may be small. The main comment, however, is that in a similar manner the official cattle slaughter figures for the Prairie Provinces may underestimate surplus slaughter cattle output for beef.

Source: Statistics Canada, Livestock and Animal Products Statistics, Cat. No. 23-203 (Ottawa: Queen's Printer, 1970); also Statistics Canada, Livestock Estimating Unit, Agriculture Division (unpublished information, Ottawa, 1972).
British Columbia Department of Agriculture, The Beef Cattle Industry of British Columbia (May, 1969).

TABLE A.3.9

FEEDER CATTLE PURCHASES: DESTINATION BY PROVINCE OF CATTLE SHIPPED OFF PUBLIC STOCKYARDS OR DIRECT FROM A COUNTRY POINT IN ANOTHER PROVINCE

Year	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Canada[a]
1960	2,638	127,676	21,822	56,514	137,691	553	347,269
1961	4,789	152,088	26,338	64,022	147,470	1,603	396,837
1962	1,931	112,247	29,765	56,306	172,231	2,959	375,619
1963	2,454	112,963	36,046	59,733	183,887	3,972	399,071
1964	2,790	167,341	34,874	68,339	193,396	1,375	468,161
1965	1,694	179,362	33,449	71,387	240,537	979	528,495
1966	2,424	179,260	40,092	79,972	235,591	1,838	539,365
1967	1,885	218,450	41,481	81,022	229,086	1,424	573,573
1968	1,161	183,249	37,215	76,383	232,110	1,015	531,453
1969	1,116	126,127	58,208	81,828	226,214	733	494,469
1970	1,117	130,947	54,405	90,016	207,548	514	483,769
1971	169	117,193	48,984	86,353	237,129	467	490,388

[a] Provincial totals do not add to Canadian total because the Atlantic Provinces are excluded.

Source: Canada Department of Agriculture, Annual Livestock Market Review (Ottawa: Canada Department of Agriculture, 1960-1971).

APPENDIX B

TABLE B.3.1

DATA USED TO ESTIMATE CANADIAN DEMAND FUNCTION FOR BEEF

Year	Consumption of Beef per capita (lbs.)	Consumer Price Index 1961 = 100		
		Beef Component	Pork Component	All Items
1960	70.0	100.7	91.8	99.1
1961	70.5	100.0	100.0	100.0
1962	71.1	109.6	103.2	101.2
1963	74.3	106.5	103.3	103.0
1964	79.4	103.0	101.0	104.8
1965	83.6	107.3	112.7	107.4
1966	84.1	118.1	130.3	111.4
1967	84.0	124.2	117.8	115.4
1968	87.7	126.3	116.8	120.1
1969	88.2	136.7	130.6	125.5
1970	85.7	140.7	128.1	129.7
1971	86.9	144.3	109.6	133.4

Note: The regression technique used to estimate per capita consumption of beef in Canada was based on the data in Table B.3.1. The two provincial variables used were population and personal, disposable income. These data are presented in Tables B.3.2 and B.3.3.

Source: Statistics Canada, Estimates of Production and Disappearance of Meats, Cat. No. 32-220 (Ottawa: Queen's Printer, 1960-1971);
Statistics Canada, Prices and Price Indices, Cat. No. 62-002 (Ottawa: Queen's Printer, 1960-1971).

TABLE B.3.2

FOR PROVINCES: PERSONAL DISPOSABLE INCOME ($'000)

Year	Maritimes[a]	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Canada
1960	1,491	6,586	10,241	1,318	1,236	1,891	2,655	25,893
1961	1,530	6,913	10,431	1,272	951	1,935	2,682	26,211
1962	1,620	7,414	11,187	1,441	1,367	2,117	2,847	28,518
1963	1,708	7,841	12,030	1,474	1,529	2,245	3,059	30,448
1964	1,830	8,533	12,818	1,588	1,369	2,336	3,314	32,385
1965	1,963	9,478	14,119	1,701	1,606	2,588	3,683	35,787
1966	2,121	10,365	15,624	1,821	1,832	2,944	4,090	39,499
1967	2,336	11,350	17,027	2,010	1,735	3,112	4,442	42,792
1968	2,554	12,165	18,396	2,227	2,014	3,476	4,763	46,427
1969	2,782	13,239	20,177	2,341	2,106	3,807	5,225	50,557
1970	2,979	14,041	21,572	2,444	1,903	4,048	5,641	53,595
1971[b]	3,266	15,415	23,690	2,604	2,083	4,444	6,192	58,857

[a] Excludes Newfoundland.

[b] Provincial figures for 1971 unavailable. The provincial percentage shares in total Canadian income were calculated for 1970 and assumed to be insignificantly different in the 1971 total Canadian figure.

Source: Statistics Canada, National Income and Expenditure Division (unpublished data, Ottawa, 1972).

TABLE B.3.3

ANNUAL ESTIMATES OF POPULATION: CANADA AND PROVINCES, 1960-1971

Year	Maritimes	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Canada
				(millions)				
1960	1.419	5.142	6.111	0.906	0.915	1.291	1.602	17.870
1961	1.440	5.259	6.236	0.922	0.925	1.332	1.629	18.238
1962	1.458	5.371	6.351	0.936	0.930	1.369	1.660	18.583
1963	1.468	5.481	6.481	0.949	0.933	1.403	1.699	18.931
1964	1.475	5.584	6.631	0.959	0.942	1.429	1.745	19.290
1965	1.480	5.685	6.788	0.965	0.950	1.450	1.797	19.644
1966	1.482	5.781	6.961	0.963	0.955	1.463	1.874	20.015
1967	1.486	5.868	7.149	0.963	0.958	1.490	1.947	20.405
1968	1.494	5.927	7.306	0.971	0.960	1.526	2.007	20.744
1969	1.498	5.984	7.452	0.979	0.959	1.561	2.067	21.061
1970	1.500	6.013	7.637	0.981	0.942	1.600	2.137	21.377
1971	1.513	6.030	7.815	0.988	0.928	1.634	2.196	21.681

Source: Statistics Canada, Canada Year Book (Ottawa: Queen's Printer, 1965, 1970-1971).

TABLE B.3.4

ESTIMATED PER CAPITA PERSONAL DISPOSABLE INCOME ($'000): CANADA AND PROVINCES, 1960-1971

Year	Maritimes	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Canada
1960	1,051	1,281	1,676	1,455	1,351	1,465	1,657	1,449
1961	1,063	1,315	1,673	1,380	1,028	1,453	1,646	1,437
1962	1,111	1,380	1,761	1,540	1,470	1,546	1,715	1,535
1963	1,163	1,431	1,856	1,553	1,639	1,600	1,800	1,608
1964	1,241	1,528	1,933	1,656	1,453	1,635	1,899	1,679
1965	1,326	1,667	2,080	1,763	1,691	1,785	2,050	1,822
1966	1,431	1,793	2,245	1,891	1,918	2,012	2,182	1,973
1967	1,572	1,934	2,382	2,087	1,811	2,089	2,281	2,097
1968	1,710	2,052	2,518	2,294	2,098	2,278	2,373	2,238
1969	1,857	2,212	2,708	2,391	2,196	2,439	2,528	2,401
1970	1,986	2,335	2,825	2,491	2,020	2,530	2,640	2,507
1971	2,158	2,556	3,031	2,636	2,251	2,720	2,820	2,715

Source: Calculated from data in Tables B.3.3 and B.3.2. The income figures were divided by the population figures.

THE REGRESSION RESULTS

The price indices for beef and pork and the per capita income figures were all deflated by the general consumer price index before the regression analysis was carried out.

A Canadian demand function for beef was estimated using the two price indices and real per capita income as the independent variables. The regression coefficients were then assumed not to vary significantly for the provinces. Similarly, it was assumed that the regional prices moved in sympathy with the Canadian indices. This assumption was made partly because of the difficulty of obtaining comparable regional time series price data. It is not unreasonable to assume, however, that regional differences in meat prices may be partially offset by regional income differentials. Where prices tend to be higher, income usually tends to be higher. The regional, real income per capita variables were then applied to the estimated Canadian demand function to extrapolate provincial per capita consumption estimates for beef.

Results

Two functional models were tested: a simple linear model and a double log model. The two functional forms gave results which were not significantly different so the simple linear model was used. The estimated Canadian function was as follows:

$$C_s = 49.69634 - \underset{(0.013206)}{0.5905P_B} + \underset{(0.04791)}{0.20677P_P} + \underset{(0.00258)}{0.04188I}$$

where C_S is per capita beef consumption, P_B the price of beef, P_P the price of pork and I, per capita, personal, disposable income. The standard errors associated with each estimated coefficient are presented in brackets. The estimated coefficients were all tested and found to be significantly different from zero at the 5 percent level of significance. The degree of variation explained by the fitted equation was 97.68 percent. The per capita income variable alone accounted for 93.8 percent of the variation in per capita beef consumption levels. On the basis of the provincial income differentials, provincial per capita beef consumption levels for the period 1960-1971 were estimated (Table 3.7, p.48). While these estimates should be an improvement on crude consumption calculations based on average Canadian consumption figures and provincial population levels, the lack of reliable and comparable provincial data series for all the variables included in the regression analysis may still lead to deficiencies. For example, it is possible that the Prairies consume more beef than the estimates indicate since it is likely that a considerable part of farm kill and uninspected slaughter is unrecorded by the official figures. A report on the British Columbia beef industry indicates that this is the case in that province.[1] It seems reasonable to assume, however, that even allowing for any deficiencies in the provincial estimates, similar regional consumption trends will continue in the near future.

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[1] British Columbia Department of Agriculture, op. cit., pp. 27-29 and Table A.3.8 (p. 145) of this study.

APPENDIX C

TABLE C.4.1

ESTIMATED NUMBER OF CATTLE ON FEED IN ALBERTA AT JANUARY 15, 1969-1971

Year	Southern Region C.D. 1-6[a]	Central Region C.D. 7-11	Northern Region C.D. 12-15	Province	Percentage of Previous Year
1969	372,234[b]	250,245	78,711	701,190	
1970	604,980	445,304	120,195	1,170,479	166.92
1971	637,000	433,000	129,500	1,200,000	102.52

[a] C.D. 9 is combined with C.D. 3.

[b] 1969 figures are not strictly comparable since the weight classifications of feeders were altered in this year.

Source: Calculated from Alberta Department of Agriculture, Agricultural Statistics (Edmonton: Alberta Department of Agriculture, in cooperation with Statistics Canada, 1969-1971).

TABLE C.4.2

ORIGIN OF LIVESTOCK SALES AT THE ALBERTA PUBLIC STOCKYARDS

	Calgary				Edmonton				Lethbridge			
	1968	1969	1970	1971	1968	1969	1970	1971	1968	1969	1970	1971
	(Cattle: number of head)											
C.D. 1	363	70	100	62	--	--	--	--	3,614	2,477	1,099	1,201
C.D. 2	6,404	6,074	4,943	3,365	59	--	16	--	23,023	21,290	21,394	16,295
C.D. 3	13,027	11,027	9,844	9,562	30	--	--	--	7,946	7,309	7,303	5,869
C.D. 4	12,916	11,064	8,898	10,467	209	43	246	83	133	--	--	--
C.D. 5	67,728	65,303	57,289	54,082	--	335	--	--	824	1,476	1,289	1,094
C.D. 6	161,490	150,397	128,127	118,112	61	253	32	--	--	--	18	71
C.D. 7	12,625	8,303	4,359	5,753	23,964	23,540	20,446	21,531	7	--	--	--
C.D. 8	33,702	23,523	14,781	14,545	4,351	4,264	2,165	2,323	42	--	--	--
C.D. 9	141	72	10	44	--	--	--	--	--	--	--	--
C.D. 10	553	446	170	112	53,860	52,712	48,636	49,022	--	--	--	--
C.D. 11	100	113	76	32	66,308	58,439	52,102	54,062	--	--	--	--
C.D. 12	--	--	--	--	27,856	22,386	20,880	21,235	--	--	--	--
C.D. 13	--	--	--	--	46,422	48,453	42,698	48,267	--	--	--	--
C.D. 14	--	--	--	--	5,950	4,931	3,742	4,595	--	--	--	--
C.D. 15	13	--	--	--	18,270	18,972	13,143	11,813	--	--	--	--

Source: Canada Department of Agriculture, Livestock Market Reports of Calgary, Edmonton and Lethbridge (Calgary, Edmonton, Lethbridge: Canada Department of Agriculture, 1968-1971).

APPENDIX D

TABLE D.4.1

DEPARTMENT OF REGIONAL ECONOMIC EXPANSION: MAXIMUM INCENTIVE GRANTS BY REGION, 1971

Region	Expansions/Modernisations	New Plants or New Product Expansions
A (Atlantic)	up to 30% of capital cost	up to 35% of capital cost and up to $7,000 per job created.
B (Standard)[a]	up to 20% of capital cost	up to 25% of capital cost and up to $5,000 per job created.
C (Special)	up to 10% of capital cost	up to 10% of capital cost and up to $2,000 per job created

[a] This classification applies to Alberta.

Source: Department of Regional Economic Expansion, _Canada Development Incentives for Industry in Designated Regions and Special Areas_, Cat. No. RE 32-870 (Ottawa: Information Canada, 1971), p. 6.

LIST OF CONDITIONS ATTACHED TO THE D.R.E.E. INCENTIVES PROGRAMME, 1971[a]

1. Each application for assistance will be reviewed and analysed in an economic feasibility study conducted by D.R.E.E. at the discretion of the Minister. Any offer remains open for 90 days.

2. The feasibility study considers:

    a) extra costs or risks of a project because of its location.

    b) other public costs such as utilities, pollution control, etc.

    c) the probability and nature of other development that may follow (linkage effects).

    d) social benefits from the amount, nature, and location of the direct and indirect employment created.

3. Definitions:

    a) approved capital costs: these include the cost to the applicant of purchasing buildings, equipment and machinery plus the direct costs of designing, acquiring, constructing, transporting and installing the assets.

    b) the number of jobs directly created by a project: the average number of employees in, or based upon, the facility during the second and third years of commercial production.

    c) a loan guarantee: D.R.E.E. may improve the security available to the lender by guaranteeing part of a loan if a borrower is unable to borrow the required amount on reasonable terms for a viable project.

    d) new product expansion: the additional products must be ones that could not be manufactured or processed economically with the existing machinery and equipment of the plant.

4. Other conditions:

    a) minimum investment: for an expansion or modernisation, approved capital costs must be at least $30,000; for a new plant or new product expansion, the approved capital costs must be at least $60,000.

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[a] For a more detailed explanation of definitions and conditions of the programme, refer to the Office Consolidation of the Regional Development Incentives Act, 1968-1969, c.56 amended by 1970-71, c.10 and the Regional Development Incentives Regulations P.C. 1969-1971 as amended by P.C. 1971-145 (Ottawa: Information Canada, 1971).

b) equity requirement: for a new plant expansion or modernisation, the applicant must provide equity capital which is at least 20 percent of the approved capital costs, and 20 percent of the book value of the existing facility.

c) the applicant must cooperate with Canada Manpower Centres in his recruitment and training of manpower and must undertake to employ to the maximum extent practicable, residents of the region in which the facility is located.

d) the applicant must give Canadian manufacturers a reasonable opportunity to supply competitively, the machinery and equipment for the project.

e) development incentives are exempt from income tax, but the amount of a grant cannot be depreciated as a capital cost for tax purposes.

Source: Canada Department of Regional Economic Expansion, _Canada Development Incentives for Industry in Designated Regions and Special Areas_, Cat No. RE32-870 (Ottawa: Information Canada, 1971).

TABLE D.4.2

CONDITIONS OF ENTRY IN THE MEAT PACKING AND PROCESSING INDUSTRY

Condition of Entry	A	B	C	D	E	F	G
Minimum Capital Required ($)	50,000	50,000	1,000,000	2,000,000	1,000,000	50,000	50,000
Scale Advantages above Minimum Unit	nil	nil	nil	some	nil	nil	nil
Advantages of Product Differentiation	nil	nil	1/2-2¢ per lb.	1/2-2¢ per lb.	1/2-2¢ per lb.	2-10¢ per lb.	nil
Patent Advantages	nil	nil	nil	nil	nil	nil	nil
Absolute Cost Advantages	nil	some[a]	some	some	some	nil	nil

[a] This answer is not consistent with previous answers in this column. It apparently derives from the steady supply flow which large firms can achieve. (This table was compiled in 1965 and a steady supply flow may not, in fact, be the case.)

Note: A Slaughter of beef, calves, lamb
B Slaughter of beef, calves, lamb and hogs
C Slaughter of beef, calves, lamb and hogs manufacture of smoked and cooked meats
D Slaughter of beef, calves, lamb and hogs manufacture of smoked and cooked meats and sausage products
E Manufacture of smoked and cooked meats
F Manufacture of sausage products
G Renderers (fat and bones)

Source: A.J.E. Child, Economics and Politics in U.S. Banking and Other Essays (Saskatoon: Midwest Litho Limited, 1965), p. 107.

APPENDIX E

TABLE E.4.1

COMPARISON OF COST ITEMS BETWEEN MEAT PACKING AND OTHER INDUSTRIES IN ALBERTA, 1968

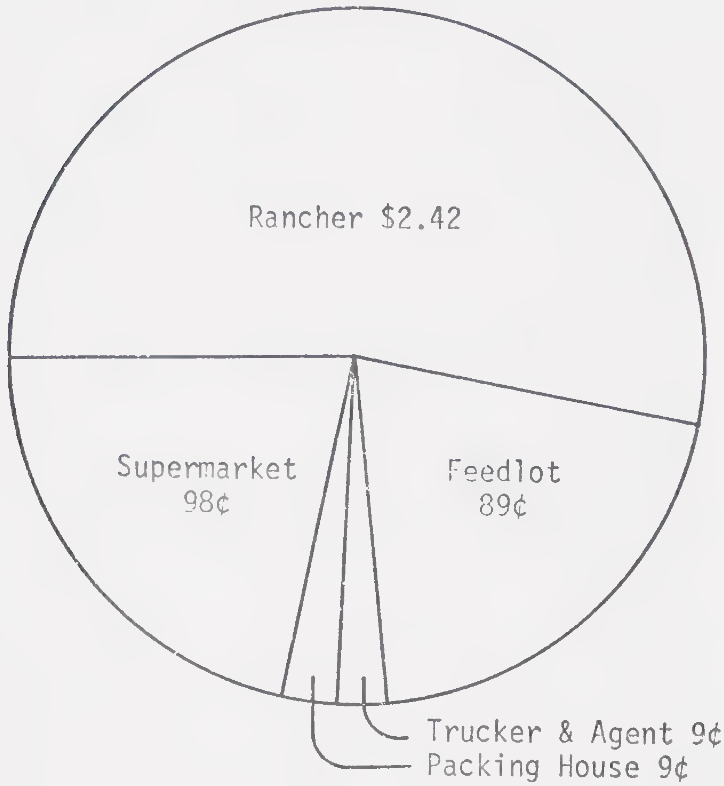
Industry	Establishments (no.)	Employees (no.)	Wages & Salaries	Cost of fuel & Electricity	Cost of Materials & Supplies Used
			$	$	$
Slaughtering & Meat Packing	41[a]	4,929	31,362,382	1,267,335	317,500,973
Flour Mills	7	591	3,046,726	263,607	28,485,108
Bakery Products	167	2,003	8,842,845	594,162	11,072,560
Textiles	212	426	2,669,026	158,553	5,024,106
Primary Metals	1,713	1,801	13,101,441	1,976,240	80,098,316

[a] Most of the 41 plants are small custom slaughter businesses, often family operated. The largest share of the costs shown here is accounted for by the three multi-plant firms.

Source: Department of Industry and Tourism, Alberta Industry and Resources (Edmonton: Alberta Bureau of Statistics, 1970), p. 22.

FIGURE E.4.1

DISTRIBUTION OF THE U.S. CONSUMER DOLLAR ON A 3 LB. T-BONE STEAK AT $4.47, 1972[a]



Source: Life Magazine, April 14, 1972, p. 3.

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[a] Alternatively, the cost of a beef animal to various agents is:

	Price/lb. paid by each "buyer"	Total Cost/ Head Paid
Rancher (700 lb. calf) $200 cost to rear one calf		
Feedlot (average net profit $1.55/head)	38¢	$266
Packer (1,000 lb. animal)	35¢	$350
Retailer (620 lbs. dressed)* (needs 82¢/lb. to cover costs)	53¢	$328
Consumer (440 lbs. of saleable meat)**	$100	$440

* U.S. carcase yield includes kidney, suet, etc., so it is 3-4% higher than the Canadian yield

** Loss because of shrink, trim, fat, and bone.

TABLE E.4.2

COST OF MATERIALS AND SUPPLIES USED AND VALUE OF SALES FOR SELECTED CANADIAN INDUSTRIES, 1961-1968

Industry	Cost of Materials and Supplies ($ x 10^6)		Percentage Increase	Value of Sales ($ x 10^6)		Percentage Increase
	1961	1968	1961-1968	1961	1968	1961-1968
Bakeries	165.7	227.2	37.1	365.1	476.9	30.6
Dairy Products	416.7	895.6	45.2	884.9	1,141.0	28.9
Feed Mills	226.9	405.0	78.4	290.9	513.2	76.4
Fish	115.4	223.1	93.3	182.6	324.5	77.2
Slaughtering and Meat Packing	918.4	1,450.8	57.9	1,080.9	1,772.5	63.9
Breweries	66.4	93.1	40.2	257.2	349.2	35.7

Source: S.M.H. Rizvi, "Dimensions and Performance of Some Important Sectors of the Canadian Agribusiness System," (unpublished information, Ottawa: Agricultural Economics Research Council of Canada, 1971), p. 8.

TABLE E.4.3

TYPICAL BEEF COST SHEET PREPARED BY CANADA PACKERS LTD.

	Live Animal Cost			Carcase Cost			
	Live Animal Weight (lbs.)	Price per pound	Cost per Animal		Weight	Cost per pound	Total
Live Animal	1,050	28.72¢	$301.56	Carcase	598½	46.00¢	$275.31
Buying Expense			0.60	Cooler labour		0.28	1.68
Stockpen expense			0.43				
Slaughter labour			1.80	Services, maintenance, supplies plant expense, loading, municipal taxes; office		0.90	5.39
Allowance for Condemnation			0.43	Fixed charges		0.40	2.39
			$304.82			47.58	284.77
Less net returns from by-products produced			29.51	Selling & Delivery (Toronto area)		1.05	6.28
Cost of 598½lb. carcase			$275.31	Total Cost of Carcase		48.63¢	$291.05
				Wholesale Market (Toronto)		48.95	$292.96
				Difference		+ 0.32	+ 1.91

Source: Submission and Exhibit to the Special Joint Committee of the Senate and House of Commons on Consumer Credit, by Canada Packers, Ltd., 1966.

TABLE E.4.4

FINANCIAL RATIOS FOR SOME MANUFACTURING INDUSTRIES IN THE UNITED STATES, 1964

Industries	Earnings as a Percentage of: Sales	Assets	Net Worth	Sales to Assets Ratio
Durable Goods				
Motor Vehicles & Equipment	6.95	10.82	16.76	1.56
Electrical Products	4.18	6.29	11.02	1.51
Other Fabricated Metal Products	3.73	6.05	10.00	1.62
Primary Iron & Steel	5.57	5.71	8.70	1.02
Miscellaneous Manufacturing	3.56	4.99	9.28	1.40
Total Durable Goods	5.11	7.04	11.52	1.38
Non-Durable Goods				
Dairy Products	2.25	6.58	9.21	2.52
Bakery Products	2.17	5.77	8.85	2.65
Alcoholic Beverages	3.84	5.61	8.69	1.46
Other Food & Kindred Products	2.60	6.04	10.43	2.33
Textile Products	3.13	5.22	8.44	1.67
Clothing	5.11	6.00	9.08	1.17
Petroleum Goods	10.45	8.23	11.20	0.79
Total Non-Durable Goods	5.34	7.33	11.28	1.37
Total Manufacturing	5.22	7.18	11.40	1.37
Meat Packing Industry	1.14	5.68	9.22	4.99

Source: American Meat Institute, Financial Facts about the Meat Packing Industry (Chicago, Illinois: American Meat Institute, 1964), p. 18.

TABLE E.4.5

FINANCIAL RECORD OF THE UNITED STATES MEAT PACKING INDUSTRY COMPARED WITH ALL MANUFACTURING CORPORATIONS, 1960-1964

Industry	Net Earnings ($'000,000)	Ratio, Sales to Assets	Ratios, Earnings to:			Earnings per 100 lbs. Dressed weight of Slaughter (cents)
			Sales	Total Assets	Net Worth	
Meat Packing						
1960	110	5.2	0.8	4.3	6.6	40
1961	85	5.1	0.6	3.2	5.0	31
1962	113	5.2	0.8	4.2	6.6	40
1963	120	5.1	0.8	4.3	6.9	40
1964	166	5.0	1.1	5.7	9.2	52
Average 1960-64	119	5.1	0.9	4.3	6.9	41
U.S. Manufacturing Corporations Average 1960-64	18,186	1.4	4.7	6.3	9.8	--

Source: American Meat Institute, Financial Facts about the Meat Packing Industry (Chicago, Illinois: American Meat Institute, 1964).

APPENDIX F

DESCRIPTION OF PACKING PLANT OPERATIONS

This Appendix gives a brief account of a meat packer's method of business and packing plant technology. This material is largely based on papers by Child[1] and Leckie.[2]

Live animals are not collected in quantity at a plant before slaughter. Instead, efforts are made to ensure a steady slaughter flow in daylight hours. The procedure considered optimum for animals going through a central stockyard is to deliver them to the yard during the night and to transfer them to the plant as soon as possible in the day. A prime objective is to minimise shrinkage and bruising through transportation and waiting time.

Livestock are obtained by the packer in several ways:

1. Direct sales from the producer's farm to the packer. Price can be negotiated directly by a travelling packer buyer, at the plant at time of delivery, or over the phone in advance of delivery.

2. Sales from the producer, to the stockyard, to the packer. Packer buyers purchase animals from commission firms each market day. The agencies or auctioneers at country auctions may offer lots over the phone to packers.

The packer buyer must analyse the current supply situation which determines price changes. He has the task of getting enough throughput at some ceiling price. In periods of short supply this

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[1] A.J.E. Child, Economics and Politics in U.S. Banking and Other Essays (Saskatoon: Mid-West Litho Ltd., 1965).

[2] H. K. Leckie, "Canada's Meat Packing Industry" in"Canada's Beef Industry. Proceedings of the and Workshop of the Canadian Agricultural Economics Society held at Banff, Alberta, June, 1970," Canadian Journal of Agricultural Economics (June, 1970), pp. 20-52.

is complicated by strong competition from other buyers and by seasonal variation in supplies which bids up prices.

Classification and Structure

Plants may be federally inspected (mandatory for interprovincial trade) or provincially inspected--or other, if any--and may slaughter all species, specialise in one species, or have a custom kill operation. Plants may be horizontally integrated (multiple plant packer), independent, or co-operative (farmer owned). They may operate as fresh meat slaughterers or produce processed products and by-products. The processing (non slaughter) operations can be wholesale cut-up or breaking, general or specialised processing (wide variety, chains, independents, etc.), specialty products (sausage, meat pies, etc.), purveying (portion controlled meats and packages), or meat canning.

The slaughter line is a disassembly process with each man in a large plant performing one specialised operation for dexterity, quality and speed. Carcases are chilled just above freezing point and without touching each other for 24 hours to remove high body temperature. Cooler capacity limits plant capacity since no more animals can be slaughtered in a day than the cooler will hold that night, regardless of efficiency. A recent development used to relieve pressure on coolers is the "kill-ship" operation which either moves carcases (especially pork) from slaughter to refrigerated trucks or rail cars or does not hold beef for ageing for the Alberta domestic market.

Effective use of by-products--hides, skins, edible tallow, tankage (protein residue from fat and bone rendering), fancy meats (heart, liver, etc.)--may prevent losses on beef. In the plant the emphasis is on technical skill, the absence of waste motion, controlled temperatures and a high level of machine maintenance and sanitation to comply with federal inspection regulations.

The packers' sales organisation has changed to deal more with large chain buyers than with independent retailers. The problem is to sell the meat at peak freshness for the best possible price.

The main problem for each plant is to keep each production stage operating as near capacity as possible and in co-ordination with other stages.

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